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ABSTRACT

The study was designed to identify and define the factors which contribute to undergraduate navigator training (UNT) attrition and to present recommendations to reduce the effects of those factors. Longitudinal data were collected from six UNT classes and augmented with cross-sectional data from a sample of 15 UNT classes. The student data are composed of the results of interviews, a test battery, and record information. In addition, a sample of instructors was interviewed and tested. Data analysis provided evidence to support recommendations in the areas of selection, course modification, and Air Force policy. The document concludes with six appendixes: attitude scales, anxiety-state scale (short form), interview formats, instructor rating forms, phase difficulty rating forms, and summaries of various statistics. (BP)

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UNDERGRADUATE NAVIGATOR TRAINING ATTRITION STUDY

By

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November 1975
Final Report for Period July 1973 – December 1974

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This study was designed to identify and define the factors which contribute to undergraduate navigator training (UNT) attrition and to present recommendations to reduce the effects of those factors. Longitudinal data were collected from six UNT classes and augmented with cross-sectional data from a sample of 15 UNT classes. The student data are composed of the results of interviews, a test battery and record information. In addition, a sample of instructors was interviewed and tested. Data analysis provided evidence to support recommendations in the areas of selection, course modification and Air Force policy.

4

PREFACE

This report presents the results of the research being accomplished in support of Project 1123, Flying Training Development under the direction of Dr. William V. Hagin. The study was documented under Task 1123-05, Analysis of Training/Elimination Relationships in Flying Training, Dr. Norman W. King, Task Scientist, and work unit 1123-05-03, Navigator Training Attrition Study, Major James F. McKenzie, Jr., contract monitor. Dr. Edward E. Eddowes assisted in editing and providing technical guidance.

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The research reported herein was conducted under the provisions of contract F41609-73-C-0036 by McDonnell Douglas Astronautics Company - East, St. Louis, Mo., Mr. James G. Curtin, Principal Investigator. This effort covered the period between July 1973 and December 1974.

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1. INTRODUCTION

1.1 Historical Background - Prior to World War II the size, speed and range of aircraft did not require a crewman equivalent to the modern navigator. During World War II, with the advent of the long range bomber and transport aircraft, the need for this specialist became apparent. Meeting this critical need, aviation psychologists established a program of research which resulted in a viable selection procedure and an improved training program (Carter, 1947).

The selection program developed during World War II has continued to be used without major change. The type of tests which made up the World War II navigator stanine bear a resemblance to the modern instruments which make up the navigator technical composite of the Air Force Officer Qualifying Test (Miller, 1970).

Although the selection tests for navigator candidates have not drastically changed in recent years, the training requirements for navigators have been greatly affected by the impact of jet aircraft. As the aircraft equipment increased in complexity, the role of the navigator became more of an electronic systems operator and monitor. The question of whether the second crewman on advanced fighter aircraft should be a navigator or pilot has been thoroughly studied (Ratliff, Shore, Chiorini and Curran, 1969; Shore, Curran Ratliff and Chiorini, 1970; Ratliff, Chiorine, Curran and Shore, 1970). The decision to use a navigator in the second seat has been a major impetus to expanding the role and demand for navigators. All these changes have had effects on training requirements.

In recent years, some significant changes in the procedures used for training navigators have occurred. A significant degree of consolidation took place when the entire training program moved to Mather Air Force Base, Sacramento, California (Stoner, 1968a). This consolidation was partially prompted by the fact that much equipment formerly used only on bombers became common to other aircraft types (Stoner, 1968c). The use of simulators and training devices was increased (Stoner, 1968b; Ventura, 1968). Flying training has recently transitioned from the outmoded T-29 to the T-43A, a modern jet aircraft with state-of-the-art navigation equipment. Fortunately, in spite of these changes in training requirements and procedures, the undergraduate navigator training (UNT) attrition rate has not greatly increased over the years.

1.2 Current Developments - For the past several years, the attrition rate of students enrolled in UNT has been about 15%. When this study was initiated in August 1973, Self-Initiated Eliminations (SIE) were the major source of the attrition problem, comprising nearly 50% of all

eliminations. Medical eliminations (MED), which included those due to manifestations of apprehension (MOA), accounted for 21% of all eliminations. Of the remaining eliminations, 15% were due to academic deficiencies (ACAD) 7% were due to flying deficiencies (FD) and 7% were for miscellaneous reasons.

Some recent developments have potential for aggravating the UNT attrition problem. The first of these is the advent of the all volunteer force (AVF). Present personnel selection procedures used by the Air Force follow a traditional ability-achievement model. Educational achievements and tested ability are used to identify a candidate for navigator training. An unstated operating assumption has been that anyone with the abilities and education required of a navigator would also be well motivated, with all the desirable personality characteristics, attitudes, and interest required to complete the training program.

The impact of the AVF is unpredictable. On the one hand it could have a negative effect by lowering the mean Air Force Officer Qualifying Test (AFOQT) score of candidates for navigator training and the percentage of applicants with professional, scientific and engineering training. A lowered overall ability level of students enrolled in UNT may then result in an upsurge of academic eliminations. Additionally, the AVF might also increase the probability of self-initiated eliminations since military service is no longer obligatory, and a student may feel free to SIE without concern for the draft. On the other hand the AVF could have a positive effect, as a result of the input into UNT consisting strictly of volunteers, not coerced by the draft. It is possible that these students would be more highly motivated to become navigators and hence be less likely to eliminate.

The second development which will possibly affect the attrition rate is the implementation of an all jet UNT program. The impact this new program will have upon the attrition rate, however, is also unpredictable. Some training managers and instructors believe that the introduction of this program, due to its being more concentrated and intensive than the pre-jet UNIT program, will result in an upsurge of both self-initiated and academic eliminations. Others believe that this program will have the effect of reducing eliminations due to these causes, since it was more systematically developed and eradicated many of the problems that had been associated with the old program.

1.3 Rationale for Study - The 15% attrition rate of UNT students over a several year period was the reason this study was undertaken. Because of the increasingly high cost of navigator training, a detailed investigation into the causes of attrition was deemed to be a cost effective undertaking. It is believed that the investment in the research will be returned to the AF in the form of reduced training costs and the timely entrance of trained navigators into the operational squadrons.

1.4 Study Objectives - The two primary objectives of this study were: 1) to identify and define the factors that impact on UNT attrition and 2) to develop recommendations, based on these findings, that will serve to reduce this attrition.

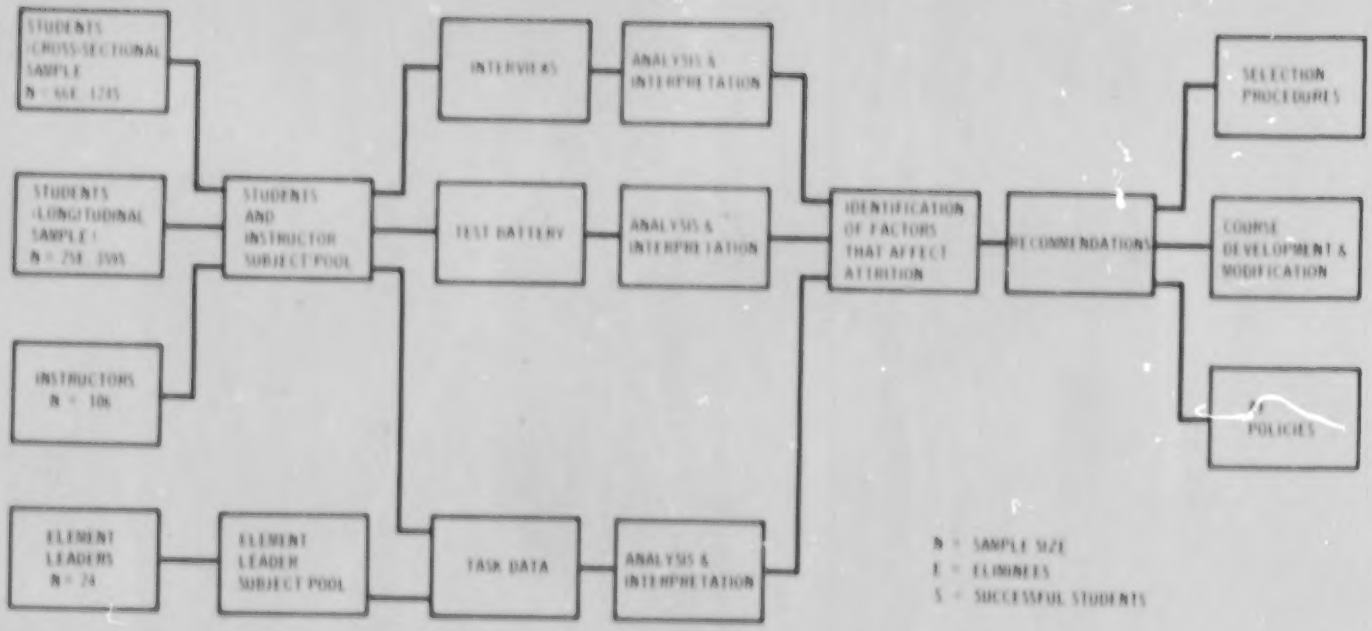
Although this study investigated the pre-jet, pre-ISD UNT program, an effort was made to relate results to the new UNT program. It is the belief of the investigators that, for the most part, the findings and recommendations are applicable to the present training program.

1.5 Study Approach - Figure 1 illustrates the overall approach taken. The figure indicates that three types of data were collected: interview data, psychological test data and task data.

The interviews, which were given on an individual basis to students and instructors, consisted of a series of open-ended questions concerning various aspects of UNT. (See Appendix C). Their primary purpose was to determine specific sources of dissatisfaction and problem areas in UNT and to elicit suggestions as to how these problems might be ameliorated.

The battery of psychological tests and scales was administered to both students and instructors and included measures of personality (the Sixteen Personality Factor Test), motivation (the Motivational Analysis Test), interests (the Strong Vocational Interest Blank), attitudes (the Attitude Toward Instruction, the Importance-Possibility Scale and Military and Navigator Career Attitude Scales, included in Appendix A), and affective traits and states (State-Trait and Anxiety Inventory). Additionally, scores from the Officer and Navigator Composites of the AFOQT were collected from student records.

The primary purpose of the battery of test was to focus on the development of selection criteria, such as motivation, interests, and attitudes.



Study Approach

FIGURE 1

Task data was obtained from specified questions asked of students and instructors during the course of their interview and from phase difficulty rating forms completed by the element leaders[1] (see Appendix A). The primary purpose of this data was to gain insight into specific areas and phases of UNT that present academic problems to students.

Figure 1 shows that each of the three types of data were separately acquired, analyzed and interpreted. These results were then integrated and factors which had an impact on attrition from UNT were identified. From these identified factors, specific recommendations were made. The recommendations that were made related to three different areas: (1) selection procedures; (2) course development and modification; and (3) Air Force policy.

[1] It should be noted that a change in the nomenclature occurred after completion of this study. Element leaders are now called flight commanders. The title of element leader will be retained in this report since this was the designation used at the time of the study period.

2. METHODOLOGY

2.1 Overview. The UNT classes from which students were drawn for data collection are shown in Figure 2. Students from a total of 21 classes were tested and interviewed. Students from fifteen of these classes (74-04 through 74-18) comprised the cross-sectional sample and students from the remaining 6 classes (74-19 through 75-02) comprised the longitudinal sample. Students in the cross-sectional sample were tested only once and at approximately the same point in time (August 1973 - Sept. 1973). The students in the longitudinal sample were all tested just prior to starting the program, and then tested periodically throughout the remainder of the program. A sample of instructors was also tested and interviewed.

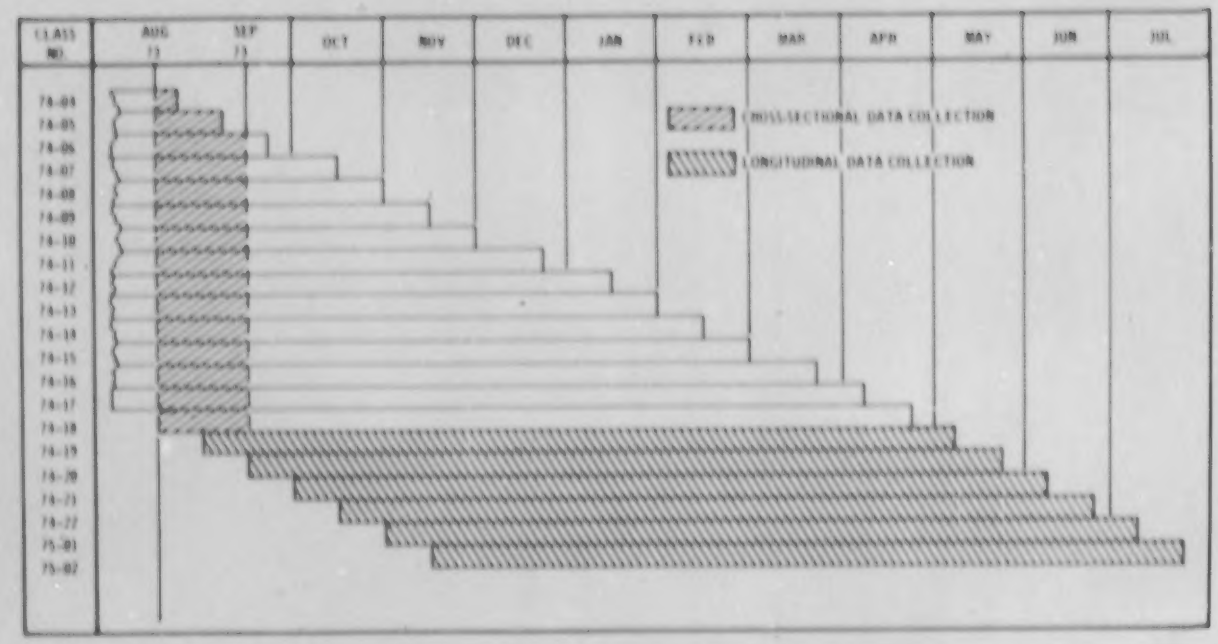
Three basic types of data were collected: interview data, test data and task data. Though these three types of data are essentially interrelated, the different manner in which each was obtained and analyzed requires that they be discussed separately.

2.2 Interview Data. Students and instructors were interviewed on an individual basis by the investigators. Each interview lasted approximately thirty to forty-five minutes, and consisted of a set of questions, the majority of which were open-ended (see Appendix C). The different circumstances of the eliminees, successful students and instructors required the formats of the interviews to be slightly different. In spite of the differences, a majority of the questions were common to all three formats.

2.2.1 Cross-Sectional Sample. Since the purpose of this project was to assess the specific factors that influence UNT attrition, it was deemed necessary to maximize the number of eliminees that participated in the study. Hence all eliminees from the fifteen cross-sectional classes were included in the sample.

UNT training managers were also specifically interested in minority group (black) attrition since the attrition rate of minority students had traditionally been higher than that of nonminority students. This higher attrition rate, combined with the fact that a relatively small number of minority students enrolled in UNT, prompted the inclusion of all minority students from these classes in the sample. The sample was completed by a random selection of section leaders and regular successful students (that is, students who were not eliminees, minorities, or section leaders).[1] Table 1 presents the frequencies for each of these types of students that were interviewed (total N = 190). It should be noted that the eliminee category consists of all students that eliminated, without regard to their designations as minorities,

[1] No foreign students, reservists or national guardsmen were included in any of the samples used for data collection in this project.



UNT Classes and Time Periods for Data Collection

FIGURE 2

TABLE 1

Total Number of Students and Instructors Interviewed
and Administered Basic Test Battery

Cross-Sectional Student Sample

	Eliminees	Successful Students			Total
		Minority Students	Section Leaders	Regular Students	
Interviewed	66	26	29	69	190
Completely Tested	63	23	25	144	255

Longitudinal Student Sample

	Eliminees	Successful Students			Total
		Minority Students	Section Leaders	Regular Students	
Interviewed	25	15	6	74	120
Completely Tested	23	18	4	337	382

Instructor Sample

	Minority Instructors	Non-Minority Instructors	Total
Interviewed	7	99	106
Completely Tested	5	83	88

section leaders or regular students. The category referred to as successful students includes all minorities, section leaders and regular students in the sample who have completed UNT.

Successful students from the cross-sectional sample were interviewed just prior to completion of UNT, and the eliminees were interviewed at the time of their elimination.

2.2.2 Longitudinal Sample. All students who eliminated from UNT and all minorities, as well as a random sample of section leaders and regular successful students from the six longitudinal classes were interviewed. Table 1 gives the frequencies for each of these groups (total N = 120). As with students from the cross-sectional sample, successful students were interviewed just prior to completing UNT and eliminees were interviewed just after they eliminated.

2.2.3 Instructors Sample. In order to obtain instructor assessments of problem areas in UNT, a total of 106 were selected for interviews. As Table 1 indicates, seven of these were minority group (black) members. This was the entire population of black instructor navigators. The other ninety-nine instructors were selected randomly from the remaining instructor population of approximately 240.

2.3 Test Data. The tests administered to students and instructors were of the paper and pencil type. Subjects were assured that the test results would be used specifically for research purposes, and held in confidentiality.

2.3.1 Cross-Sectional Sample. Table 2 summarizes: (1) the measures included in the test battery; (2) when each test was administered to students on the cross-sectional sample; (3) how many students completed each test in the battery; and (4) the type of analyses used on each.

Every student included in the cross-sectional interview sample was also administered the basic battery of psychological tests consisting of the Sixteen Personality Factor Questionnaire (16 PF), the Motivational Analysis Test (MAT), the Strong Vocational Interest Blank (SVIB), the Importance-Possibility Scale (I-P), the Trait Anxiety Inventory (A-Trait) and the Military-Navigator Attitude Scales. However, some of these tested students did not complete all tests, or completed them incorrectly. Therefore, they were not included in the analyses of the test data. Additionally, regular students who were not interviewed were randomly chosen to take the basic test battery. The number of students completely tested is given in Table 1 (total N = 225). Since the multiple regression techniques employed in the analysis of these data cannot be used with subjects who are missing data, only those students who completed every test in the basic battery were included in this sample.

TABLE 2

Data Collection for UNT Attrition Study

TEST	SAMPLE	OCCURRENCE	NO. OF Ss COMPLETING TEST	REPETITIONS	TYPE OF ANALYSIS USED ON DATA
BASIC BATTERY					
Sixteen Personality Factor Questionnaire	Cross-Sectional	See Figure 3.*	225	1	Multiple Regression
	Longitudinal	Beginning UNT	382		
Motivational Analysis Test	Cross-Sectional	See Figure 2.*	225	1	Multiple Regression
	Longitudinal	Beginning UNT			
Strong Vocational Interest Blank	Cross-Sectional	See Figure 2.*	225	1	Multiple Regression
	Longitudinal	Beginning UNT	382		
Importance - Possibility Scale	Cross-Sectional	See Figure 2.*	225	1	Multiple Regression
	Longitudinal	Beginning UNT	382		
Trait Anxiety Inventory	Cross-Sectional	See Figure 2.*	225	1	Multiple Regression
	Longitudinal	Beginning UNT	382		
Military Career Scales	Cross-Sectional	See Figure 2.*	225	1	Multiple Regression
		Beginning UNT	382		
	Longitudinal	Beginning UNT (All)	382	2	Multiple Regression and t-Tests for Correlated Means
		End UNT (Successful)	344		
		Point of Elimination (Eliminees)	23		
Navigator Career Scales	Cross-Sectional	See Figure 2.*	225	1	Multiple Regression
	Longitudinal	Beginning UNT (All)	382	2	Multiple Regression and t-Tests for Correlated Means
		End UNT (Successful)	335		
		Point of Elimination (Eliminees)	21		
PERIODIC BATTERY					
Attitude Toward Instruction	Longitudinal (Successful Only)	End of Critical Phases: AE27, GN15, NP19, ON20, NC21, End UNT	305	6	Repeated Measures Analysis of Variance
A State	Longitudinal (Successful Only)	Prior to AE and GN Examination; Prior to DC, ON and GN Check Flights.	305	5	Repeated Measures Analysis of Variance

*Cross-sectional students were administered each test during a period of one month (Aug. 20 - Sept. 20, 1973). To see what points students were in when tested, refer to Figure 2. Eliminees from the cross-sectional classes were tested at the point of elimination.

2.3.2 Longitudinal Sample. Table 2 is also a summary of test administration and analyses for the longitudinal student sample. All students in the six longitudinal classes were administered the same basic battery of psychological tests given to the cross-sectional sample. The frequencies for students completing the test series are given in Table 1 (total N = 382). In addition, four tests were given periodically throughout the entire program to students in the longitudinal sample. The Military and Navigator Career Attitude Scales were adminstered to the successful students at the beginning and end of UNT, and to the eliminees at the beginning of UNT and at the point of elimination. The successful students also took the Attitude Toward Instruction at the end of six critical phases, and the A-State at five critical points in the program. Due to the nature of repeated measures designs, only those students who completed all repetitions of a test were included in the sample. Table 2 gives the number of students who completed these periodically administered tests.

2.3.3 Instructor Sample. Eighty-eight instructors completed the basic battery of psychological tests. An additional attitude scale (Job Satisfaction) was appended to the Navigator Career Attitude Scale for this group (see Appendix A).

2.4 Task Data. Data regarding navigational tasks was gleaned from three specific questions contained in student (both cross-sectional and longitudinal samples) and/or instructor interviews. Additionally, all element leaders (N = 24) were administered a phase difficulty rating form (see Appendix E). This form simply asked the element leaders to rank order the 13 phases of UNT by difficulty.

3. RESULTS AND DISCUSSION

3.1 Interview Data.

3.1.1 Description of Analyses. Interview data were analyzed by computing and comparing response percentages for each question on the interview form. In the case of most of the open-ended interview questions, many subjects gave more than one response. This created the situation of having the percentages for a group total to some figure greater than 100.

Where noted in the following sections, Chi-Square (χ^2) statistical tests were also performed on the data. This simple test allows one to determine whether or not the distribution of one group's responses across several categories is significantly different from that of another group.

3.1.2 Reasons for Elimination.

Officially Listed Reasons for Elimination. Eliminations by cause from both the cross-sectional and longitudinal samples, and for both samples combined are tabulated in Table 3. Note, however, that these are the officially listed reasons which do not always indicate the precise reason for eliminating. Upon examination of the officially listed reasons for elimination from both samples combined, one finds the Self-Initiated Elimination (SIE) to be the primary type, with fully 52% of eliminations classified as such. Academic eliminations (ACAD), the next largest category, accounted for 17% of the eliminations. Medical eliminations (non-MOA related) accounted for 12% of the attrition. Another 10% of the eliminations were for Flying Deficiencies, while those due to Manifestations of Apprehension (MOA)[1] accounted for the final 9%. These figures closely parallel what has historically been the case in UNT.

Phases During Which Students Eliminated. Table 4 gives a breakdown of the eliminations by phase for both student samples combined. There appear to be two major points in the course of UNT where students eliminate. The first of these is during the early academic phases of UNT. Twenty-seven percent of the eliminees left the program either during the Aircraft Equipment (AE) or the Navigation Procedures (NP) phases, which are the first two phases of instruction the students are actually tested on. The celestial phases (Day and Night Celestial)

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[1]Students who eliminated for this cause were those that exhibited signs of distress (e.g., airsickness) in flight, to the point that it interfered with successful completion of the navigational tasks they were to perform.

TABLE 3

Elimination by Cause

Cause of Elimination	Cross-Sectional Eliminees N = 66		Longitudinal Eliminees N = 25		All Eliminees N = 91	
	Frequency	%	Frequency	%	Frequency	%
Self-Initiated (SIE)	36	54	11	44	47	52
Academic (ACAD)	10	15	6	24	16	17
Flying Deficiency (FD)	5	8	4	16	9	10
Manifestation of Apprehension (MOA)	6	9	2	8	8	9
Medical (MED)	9	14	2	8	11	12
TOTALS	66	100	25	100	91	100

TABLE 4

Eliminations by Phase

Phase In Which Enrolled When Eliminated	% of Eliminees N = 91		Cumulative % of Eliminees
Had not started	2		2
Aircraft Equipment (AE)	11	27	13
Navigation Procedures (NP)	16		29
Map Reading (MP)	1		30
Radar Navigation (Radar)	12		42
Day Celestial (DC)	21	32	63
Night Celestial (NC)	11		74
Grid Navigation (GN)	13		87
Overwater Navigation (OW)	10		97
Low Level Navigation (LL)	2		99*

*Does not equal 100% due to rounding errors.

constitute the other significant elimination point accounting for approximately 32% of the total eliminations. These two phases are toward the midpoint of the nine-month long UNT program. Most of the remaining eliminations were distributed among four other phases, specifically Grid Navigation (13%), Radar Navigation (12%), Overwater Navigation (10%), and Low Level Navigation (2%). Two percent of the eliminees left the program before they started training.

Comparison of Commission Source for Students. A comparison of successful students and eliminees was made to determine if there were any significant proportional differences in source of commission for the two groups. Table 5 indicates the percentage of eliminees and successful students that were commissioned by Officer Training School (OTS), Reserve Officer Training Corps (ROTC) and the Air Force Academy (AFA). OTS commissioned the largest percentage of students in both groups, followed by ROTC and then AFA. The commission source for one eliminee (2%) was the U.S. Military Academy (USMA).

TABLE 5

Percentage of Eliminees and Successful Students Receiving Commissions from Each Source

Source	Eliminees	Successful Students
OTS	70	50
ROTC	25	39
AFA	3	10
USMA	2	0

A statistical test (χ^2) indicated that the proportions of eliminees and successful students commissioned through each source ($USMA_2$ was combined with AFA) were significantly different at the .01 level ($\chi^2 = 10.691$, $df = 2$). However, a quantitative measure of the relationship, the contingency coefficient, was only .18 (.71 being the maximum possible value) indicating that the relationship between attrition rate and commission source, though statistically significant, was small.

Another method of examining the relationship between attrition rate and commission source is to inspect the historical attrition percentages for each source. Table 6 presents these data for fiscal years 1970-1974. Included in this table are the categories of "Pilot Eliminee" and "Nonrated." Pilot eliminees are those UNT students that had eliminated previously from Undergraduate Pilot Training (UPT). The nonrated category includes those students who had previously served a tour of duty as a nonrated officer and then decided to become rated by attending UNT. These five categories of UNT input source are mutually exclusive. Even though a UPT eliminee or a nonrated officer may have been commissioned through ROTC he was not counted with that group in Table 5.

Because primary interest was in differences between ROTC, OTS and AFA graduates, χ^2 tests were employed to determine if significant differences existed for any of these years and what the magnitude of the relationship was.[1] OTS graduates had the highest attrition rates and academy graduates the lowest, with ROTC graduates in between these two extremes. Significant differences were not found for FY 1970 or 1973, but were obtained at the .001 level for FY 1971 ($\chi^2 = 15.40$, df = 2) and FY 1974 ($\chi^2 = 15.27$, df = 2), and at the .01 level for FY 1972 ($\chi^2 = 12.98$, df = 2). However, even where significance was found, the magnitude of the relationship as measured by the contingency coefficient was low, with values of .13 and .11 and .12 for 1971, 1972 and 1974 respectively (.71 being the maximum value possible).

TABLE 6

Attrition Percentages by Source of Input
for Fiscal Years 1970-1974

	Attrition Percentages					
FY	ROTC	OTS	AFA	PILOT ELIMINEE	NON-RATED	TOTAL USAF
1970	18	22	11	20	10	20
1971	12	20	3	10	10	15
1972	9	18	7	6	8	13
1973	14	16	8	8	15	14
1974	9	15	2	11	11	12

[1] The χ^2 test was performed on the frequencies of attritions by source of input, not the percentages.

SIE's Stated Reasons for Elimination. A total of 47 SIE's (36 from cross-sectional classes and 11 from longitudinal classes) were interviewed. Table 7 indicates the percentage of these SIE's who reported each of the listed reasons as having played a role in their decision to eliminate. In actuality these stated reasons were inferred from their responses to the question: "Describe the events which led up to your elimination." The percentages given do not total 100% due to the fact that in many cases more than one reason was cited for elimination and the response categories are not mutually exclusive.

The table indicates that the most frequently cited reason SIE's gave for their own elimination was they did not want to be navigators, 30% having stated something to this effect. They could not see themselves doing the work of a navigator for the next five years, despite the fact that their exposure to the navigator career field was limited. Seventeen percent specifically stated that they disliked the work.

As a side issue, many of the SIE's stated that they never really wanted to go to UNT in the first place. However, officer recruiting policy at the time many of these students joined the Air Force required that they commit themselves to a flying training program, specifically UPT or UNT. At the time of this writing this problem has probably abated somewhat as a result of a decreased requirement for flying training program entrants.

Additionally, 27% of the SIE's indicated that they eliminated because they really had wanted to be pilots. Many of these were not admitted to UPT simply because of the restricted input quotas of that program. This situation left them no other choice but UNT, if they desired to be an Air Force Officer. They then decided to "try" UNT, only to find it didn't suit them. It should be pointed out that approximately 8 SIE's (17%) mentioned both that they didn't want to be navigators and that they had wanted to be pilots. Since the categories were not mutually exclusive they were counted in both. It is interesting to note that many of the successful students did not look toward being a navigator as a long term military occupation either, but as an important step in an Air Force career. Most students believed that the career of a nonrated officer was more limited than that of a rated officer. The relative advantage of being rated also accounts for the decision by many nonrated officers to enter the UNT program. Other common reasons given by SIE's for their decision to eliminate were: "disliked the Air Force and/or military" (16%), "the negative aspects of an Air Force navigator career" (15%), "disliked flying" (11%), and "personal problems" (6%).

Additionally, it should be noted that 19% of the self-initiated eliminees stated that they would have been academically dismissed in only a matter of time. Nevertheless, they were listed as SIE's. These students felt that it was "better to quit than be fired." Conversely, it was

discovered that a small number of students, who were in reality SIE's, eliminated academically on purpose. This seemed to be due to a stigma attached by some groups of students toward students who SIE. These findings indicate a need for a more accurate assessment in the future of cause of elimination, so as to reflect what is truly happening in UNT. More accurate assessment could be accomplished by having training managers investigate records and conduct in-depth interviews.

Successful Students and Instructor Statements Regarding Causes of Self-Initiated Eliminations. In addition to determining from SIE's the reasons for this type of elimination, successful students and instructors were also polled regarding this issue. Specifically, they were asked to state what they believed to be the major underlying reason for self-initiated elimination from UNT. The results are summarized in Table 7. In many cases members of each of these two groups cited more than one reason, hence the percentages when added are greater than 100%. Eighteen percent of the successful students and 30% of the instructors felt that lack of desire to be a navigator figures prominently, and 16% and 21%, respectively, felt that dislike of the military and Air Force was an important cause. A dislike of flying and personal problems were also common responses for both groups.

Another commonly cited response by these two groups was "disillusionment and/or discouragement." Disillusionment seems to stem from not knowing enough about UNT and the navigator career field prior to entering the program. Many successful students and instructors believe that after learning something about the negative aspects of UNT and a navigator career, some students get extremely disillusioned, which may lead to elimination. Discouragement, on the other hand, seems to originate from a student doing poorly on an early test or flight check. This can lead to a student believing that he has lost a chance at one of the more "choice" operational assignments since these were awarded on the basis of final class standing.[1]

A final point to be made is that a number of successful students (11%) and instructors (9%) noted that many SIE's were in reality having academic problems, a finding that substantiates what 19% of these eliminees themselves indicated.

Reasons for Academic Eliminations. Analyses similar to those done for self-initiated eliminations were done for academic eliminations. Reasons for each academic eliminee's elimination were determined from his response to the interview question: "Describe the events which led up to your elimination." In addition, successful students and instructors were asked what they felt to be primary reasons for this type of elimination. The results are presented in Table 8.

[1]This problem may have lessened since the assignment policy was changed after the completion of data collection.

TABLE 7

Commonly Cited Reasons for Self-Initiated Eliminations

STATED REASON FOR SELF-INITIATED ELIMINATIONS	SIEs* N = 47	SUCCESSFUL** STUDENTS N = 219	INSTRUCTORS** N = 106
Didn't want to be a navigator	30	18	30
Wanted to be a pilot	27	-	-
Disliked work of a navigator	17	12	7
Disliked Air Force/Military	6	16	21
Negative aspects of navigation career	15	10	13
Would have been academically dismissed or academic problem	19	11	9
Disliked flying	11	15	14
Personal problems	6	3	8
Lost interest	6	1	1
Disillusionment and/or discouragement	6	17	13
Pressure from wife or family	4	4	20
Not properly prepared for UNT	-	-	5
Disliked UNT program		12	7
Pressure competition	-	6	-
Disliked military regulations	2	5	4
Too much work	-	4	6
Don't know	-	8	5
Others	9	28	11

*Percentage of SIEs that cited given reason for their own elimination

**Percentage of successful students and instructors that cited given reason why students SIE.

TABLE 8

Commonly Cited Reasons for Academic Eliminations

	Response Percentage (%)		
	Academic Eliminees N=19	Successful Students N=219	Instructors N=106
Not motivated to study/Not motivated	-	21	23
Can't take ATC type tests	19	8	3
Lack skills and aptitude	43	19	41
Poor study habits	-	8	9
Admissions not selective enough	-	-	-
Don't ask for help	-	1	6
Personal problems	19	2	1
Get behind - Difficult to catch up	13	1	2
Pressure/Competition of program	6	5	1
Program too fast	-	1	2
Other	13	8	9
Really SIE	6	3	3
Don't Know/Unclear/Lack of proficiency	6	31	24

The most common reason cited by academic eliminees (43%) for their own elimination was that they lacked the necessary prerequisite skills (e.g., a mathematical background) and aptitude for navigation, and therefore encountered problems other students did not. Forty-one percent of the instructors also cited this as a significant reason. A somewhat smaller percentage of successful students (19%) felt this was a primary cause of academic eliminations.

No academic eliminees admitted not studying or having poor study habits, yet sizable percentages of successful students and instructors felt these to be reasons for this type of elimination. Nor did any academic eliminees state that not asking for extra help was a factor in their own elimination; only 1% of the successful students stated such. However, 6% of the instructors did feel this was a contributing factor.

Inability to take "ATC type" tests (multiple choice) was cited by 19% of the eliminees but by only 8% and 9% of the successful students and instructors, respectively. Many of those who cited this as a reason pointed out that many questions on the tests were ambiguous and appeared as if they were designed to "trick" students rather than assess knowledge. Also, some felt that if a student went to a college where essay tests were primarily used, he might have problems learning how to take multiple choice tests, and therefore would be at a relative disadvantage to other students who were familiar with this type of examination.

Another point regarding academic eliminations is that many academic eliminees stated that they were having personal problems, yet only a very small percentage of successful students (2%) and instructors (1%) perceived this as a factor in academic eliminations. It is possible that either the eliminees were using this as an excuse to minimize their own lack of study and/or aptitude, or that successful students and instructors are insensitive to these problems and the impact they have.

Finally, it should be noted that a small percentage of the academic eliminees either clearly stated or implied that they were really SIE's, and that they purposely academically eliminated. Some of the successful students and instructors also believed this. The motivation for doing so may be that it is believed to be a more "honorable" way of leaving the program. In this way, the eliminee does not get labeled as a "quitter." It is also possible that students who do this may want to remain in the Air Force and feel that they have a better chance of being retained if they academically eliminate rather than if they voluntarily eliminate.

Reasons for Flying Deficiency Eliminations. As with each of the previous two types of eliminees, flying deficiency eliminees were asked to describe the events which led to their elimination. Additionally, successful students and instructors were asked what they felt to be primary reasons for this type of elimination. The results of this inquiry are contained in Table 9.

The most common reason given by flying deficiency eliminees (33%) for their own elimination was their inability to handle the "pressure" of the flying environment. Lack of prerequisite skills and aptitudes and lack of motivation to study were also prominently cited reasons by the eliminees themselves. These same three responses were among the most frequently cited by successful students and instructors as well. Finally, the inability to "pace" was cited by all three groups as a reason for flying deficiency eliminations. Further discussion regarding pacing skills is contained in Section 3.3.3 of this report.

3.1.3 Responses to Other Interview Questions by Eliminees, Successful Students and Instructors.

Prior Knowledge of What UNT was Like. In general, both the eliminated and the successful students seemed uninformed about the navigator career field and UNT prior to arrival at Mather AFB. Of the eliminees, 55% stated that they did not know what UNT was going to be like, while 43% of the successful students cited this deficiency. Only 35% of both the eliminees and successful students stated that they knew what UNT would be like, while 10% of the eliminees and 22% of the successful students stated they had a vague notion. A further breakdown of the figures regarding prior knowledge of UNT by type of elimination, as shown in Table 10, highlights this issue. Sixty percent of the SIE's, 63% of the academic eliminees and 67% of the flying deficiency eliminees did not know what UNT would be like.

The students that stated they thought they knew about UNT beforehand, and those that had a vague notion, were questioned further by asking them how UNT compared to their expectations.

TABLE 9

Commonly Cited Reasons for
Flying Deficiency Eliminations

	Response Percentage (%)		
	Flying Deficiency Eliminees N=9	Successful Students N=219	Instructors N=106
Lack skills and aptitude	22	10	31
Can't pace	11	8	8
Can't handle "pressure"/get nervous flying	33	14	11
Not motivated to study	22	11	10
Don't ask for help	-	-	2
Lack of confidence	-	3	1
Lack of preparation	-	1	3
Other	33	11	13
Don't know/Unclear/Didn't say/Lack of proficiency	-	47	34

TABLE 10

Percentage of Students That Thought
They Knew What UNT Would Be Like

	SIE N = 47	ACAD N = 16	FD N = 9	MOD N = 8	MED N = 11	All Eliminees N = 91	Successful Students N = 219
Yes	34	25	11	75	45	35	35
Vague Notion	6	13	22	-	18	10	22
No	60	63	67	25	36	55	43

Only 15% of the eliminees and 20% of the successful students reported that UNT fulfilled their expectations. These figures seem to call for an upgrading in the amount and nature of the information prospective UNT students receive. Although some students do find out what UNT is like, they most likely obtain this knowledge through informal sources. The remainder must rely on whatever formal briefing are available. Students have indicated that these briefings emphasized the school's good location and the more attractive navigator assignments. Little is known about the subjects that are taught, the length of an "average" training day, how much flying is involved, homework, and other seemingly pertinent information. Negative aspects of the school and the navigator career field are left unmentioned. Many students are led to believe that UNT is very easy and then find otherwise. Others have premature misconceptions of the job of a navigator and of flying.

It also appears that the Air Force Academy does better in familiarizing students with the UNT program than does ROTC, which in turn does a better job than OTS in this regard. The majority of OTS graduates (53%) stated that they did not know what UNT would be like, while a slightly smaller percentage of ROTC graduates (44%) did not. However, only 16% of the AFA graduates stated that they had no idea what UNT would be like.

Professional Discrimination. As originally devised, the interview formats did not specifically address the issue of professional discrimination toward the navigator. However, after a number of interviews with eliminees, successful students and instructors, it was noticed that an air of pessimism existed throughout UNT about the navigator career field. The sentiments of many students and instructors can be summarized in the often heard statement: "Navigators are second class citizens (second to pilots) in the Air Force." Specifically, they cited three areas in which navigators were discriminated against: (1) limited promotion opportunities, (2) limited command opportunities, and (3) limited career broadening opportunities.

In later interviews the question, "How do you see that status of navigators within the Air Force?", was specifically asked. Table 11 presents the data from these interviews. It illustrates the point that many of the students and instructors who believed a navigator's status was less than that of a pilot also were optimistic that this status was improving or felt that it was a favorable status. A logical explanation for this finding is that the period during which these data were collected was one of transition with regard to this issue. It was during this time that Section 8577, Title 10, United States code, a regulation which prohibited navigators from commanding flying units, was in the process of being rescinded. This may have been responsible for the more optimistic attitudes. However there still seems to be a strong sentiment among the UNT community, including students, that the commander of the Navigator Training Wing should be a navigator. The problem was recently brought to the surface by the appointment of a pilot as Wing Commander. The issue was further highlighted by the fact that an eminently qualified navigator, who had served as a Wing Vice-Commander, appeared as a likely candidate and had expressed a strong interest in the position.

TABLE 11

Attitudes Regarding the Status of Navigators

Response	Response Percentage (%)*		
	Eliminees N = 19	Successful Students N = 111	Instructors N = 58
2nd to pilots but status improving and/or high	47	69	62
2nd to pilots and status not improving and/or low	37	24	34
Equal to pilots	10	4	--
Higher than pilots/Better off than pilots	--	1	3
No opinion	5	2	--

*Percentages based on the responses of those that were asked the question.

It was observed that an active grapevine exists at Mather AFB among navigator students and instructors with respect to Air Force policies and decisions which have impact upon the status of the navigator career field. It is therefore believed that the general issue of professional discrimination against navigators, and its impact on both student and instructor morale (and hence attrition) cannot be ignored.

Although Section 8577 of Title 10 was repealed December 18, 1975, if positive results are to be seen it must not only be possible for navigators to command flying units but also probable that a representative number will.

Either some real changes need to be made or the prospective navigator student should be thoroughly and realistically briefed, prior to entering the program, on the opportunities that will be available to him as a navigator in the Air Force.

Displeasing Aspects of UNT. Table 12 lists the most commonly cited aspects of UNT that were considered displeasing by eliminees and successful students. Instructors, when interviewed, were asked what aspects they felt were displeasing for students and their responses are also listed in the table. In addition to listing the displeasing aspects, the table indicates the percentage of each group that cited a particular aspect.

Though there was some commonality between eliminees, successful students, and instructors with regard to displeasing aspects of UNT, there also appear to be a number of differences. Poor scheduling of classes and flight missions was expressed as a source of irritation by 24% of the successful students and 18% of the instructors, while only 8% of the eliminees felt this to be a displeasing aspect of UNT. However, the relatively low percentage of eliminees that viewed scheduling as displeasing may be artifactual, because scheduling problems often come later in the program, after many eliminees have already left the program. Flights and classes at varying and often unpleasant times (e.g., Friday evenings), the heavier than usual workload at the beginning of the course, and the occasional 3-4 hour breaks between classes are some of the mentioned dislikes of the present scheduling system. Another scheduling complaint was the placement of check rides the day before an academic test or vice versa. Students stated that when they express these complaints, there is a tendency for responsible personnel to blame the computer and disregard the fact that the computer is programmed by people.

The most frequently aired complaint about UNT by eliminees was that there was not enough time to learn the material, 18% having stated something to this effect. Instructors also tended to see this as a displeasing aspect for students. However, only a small percentage of successful students expressed this. This finding has implications for development of a "self-paced" instructional program within the framework of UNT. For those who complained of not having enough time to learn the material, the problem seemed particularly acute during the early phases of the program. Therefore, the possibility of self-pacing during these phases might be explored. The possibility that this would reduce not only the number of academic eliminations but also self-initiated eliminations exists. The reasons why academic eliminations would be reduced is obvious. Self-initiated eliminations, on the other hand, might be reduced because the students that were previously "getting by"

TABLE 12

Displeasing Aspects of UNT

Aspect of UNT	Response Percentage (%) Eliminees N = 79*	Successful Students N = 219	Instructors N = 106
Not enough time to learn material	18	3	11
Scheduling	8	24	18
AF regulations and discipline	9	5	21
Material taught	4	3	3
Tests	8	8	8
Treatment of students/Instructor attitudes	11	21	21
Nothing	14	5	3
Inconsistent instructor grading and navigation methods	4	16	23
Physical training	1	5	2
Check flights	-	3	-
Equipment used	4	7	1
Grid navigation	1	-	6
Lack of correlation between flying and academics	-	5	5
How operational assignments made	-	4	2
Flight delays/abortions	5	6	7
Other	33	28	26

*Twelve of the ninety-one eliminees were not asked the question dealing with displeasing aspects of the UNT program.

might exhibit improved performance and consequently not become discouraged. (It has been observed that discouragement over early grades may be a factor for this type of elimination.)

The academic tests were another grievance of the students. Approximately 8% of both the eliminee and successful student samples expressed negative attitudes toward the typical ATC test (multiple choice). Specifically, they felt that the tests did not measure their navigation knowledge but rather their ability to read the question or memorize the text. Additionally, they objected to the use of "trick" and ambiguous questions on the tests.

A complaint of a number of successful students (16%) was the inconsistency in grading check flights. Not only did they feel that there was too much subjectivity in the grading, but also they observed that the instructors have a variety of preferred navigation techniques. As an example, an instructor on a practice flight might teach the student to use some of the subtle techniques he prefers to use when navigating, and then the student might be penalized on a check flight if he uses them. Only a few eliminees voiced this complaint, but this may be due to their relative lack of flight experience. It is of interest to note that an even larger percentage (23%) of the instructors recognized this complaint and attached some validity to it.

Most students consider the quality of the instructors to be good. Generally, the instructors are willing to go out of their way to help students. However, in the flying environment the situation is often quite different. Instructor attitudes that students should be accomplished navigators prior to graduation, or that only "dummies" forget the techniques previously taught, are sometimes directed toward the students. Not only did 10% of the eliminees and 21% of the successful students cite instructor treatment of students ("as students rather than officer students") as a negative aspect of UNT, but instructors themselves (21%) recognized this deficiency. One successful student even suggested that harassment by instructor navigators was a reason some students elect to voluntarily eliminate. Several students indicated that there appeared to be a very high workload placed upon instructional personnel assigned to Mather, and that this would (and in several instances did) influence the motivation, attitude and effectiveness of these instructors during training. It may be that in addition to the total work load being high, the distribution of these hours is also a problem. It was not uncommon for an instructor to be scheduled to fly with the students three or four days in succession, and then be in the classroom the next few days.

If the work load of instructors were reduced, or at least redistributed, it is very possible that there would be a corresponding improvement in instructor attitudes and treatment of students.

Twenty-one percent of the instructors perceived the Air Force regulations regarding appearance (i.e., haircuts) and Air Force discipline as displeasing aspects of UNT. Contrary to instructor beliefs, only 8% of the eliminees and 5% of the successful students felt that the regulations were displeasing aspects of UNT and the Air Force. This discrepancy may be the result of a few students being particularly vocal in the expression of their negative feelings regarding these regulations and their enforcement. Instructors may hear these complaints expressed and then tend to overgeneralize the attitudes of a few to the rest of the student body. What might be suggested here is that the role of regulations and discipline as a determinant of morale might be deemphasized. It is believed that students do not object to the regulations as such, but rather the way they are imposed. Support for this contention comes from the previously cited finding that many students did object to the attitudes some instructors held regarding students, and the consequent treatment they received.

Flight delays and aborts were another source of irritation. Students disliked having to wait around, sometimes for hours, for a flight to take off either because of bad weather or maintenance that was being done on the aircraft. Often after waiting a long time the flight was aborted anyway. Some of the delays due to maintenance may be avoided in the future by replacement of the T-29 aircraft with the T-43, but this will not alleviate the problem with regard to weather. It might be beneficial from the standpoint of student morale to inform students of the policy with regard to the amount of time that will be allowed to elapse (3 hours) before a flight is canceled. This would relieve some of the uncertainty of the situation and perhaps make the experience more bearable.

Physical Training (PT) was also noted by several individuals as a displeasing aspect of UNT. It was found objectionable primarily because of its scheduling. A student might be scheduled for PT three times in one week and then not have it again for two weeks. It was felt that little is gained by PT scheduled in such a manner. If PT is to be programmed into UNT, it seems there should be some regularity to it, particularly if the intent is, in fact, physical conditioning.

Finally, though not mentioned at all by any eliminees and a relatively small percentage of successful students and instructors, it seems worth mentioning that some did object to the lack of correlation between the academic and flying portions of a subject area. Students were often flying missions for a particular academic phase after they were already well into another academic phase.

Academic Preparedness for UNT. As Table 13 shows, eliminees as a whole were somewhat evenly split regarding the question of whether they felt they were properly prepared, in an academic sense, for UNT. Forty-seven percent felt they were prepared, while 52% felt they were not (1% stated that they could not say). Of the successful students 67% felt properly prepared, 29% did not and 4% could not say. A statistical test (χ^2) revealed this difference to be significant at the .001 level ($\chi^2 = 15.24$, df = 2). An important, though not surprising, finding is that the two eliminee groups that felt the least prepared were the academic and flying deficiency eliminees, with 81% and 67% respectively stating they did not feel properly prepared. However, the question must be raised of how contaminated by "rationalization" and/or "sour grapes" attitudes this latter finding is. It is possible that a student who eliminates for academic or flying deficiencies might deny his own lack of study or intellectual aptitude, simply by saying his educational background was not appropriate.

An examination of the educational backgrounds of students does provide some insight into the discrepancies between eliminees and successful students with regard to the issue of preparation for UNT. Only 19% of the eliminees, while in college, majored in subjects classified as technical in nature (engineering, physics, chemistry and mathematics). A larger percentage (34%) of successful students majored in these fields. A χ^2 test revealed these proportions to be significantly different at the .01 level ($\chi^2 = 7.46$, df = 1), which indicates that a technical background is somewhat helpful in preparing a student for UNT. Obviously, a technical education is not an absolute necessity for success in UNT, but the data suggest that it is beneficial.

The previous findings suggest that a prenavigator training course for students whose educational backgrounds are of a nontechnical nature might be helpful. It could be an optional course of 1-2 weeks duration conducted in the learning center. At present, many students have been reporting to Mather AFB a week earlier than the start of the UNT program, so a prenavigator training course might fit in well.

Advice to New Students - A number of suggestions for students just entering UNT were made by eliminees, successful students, and instructors. These suggestions and the respective percentages of each group that made them are indicated in Table 14.

The most frequent suggestion by members of each group was to either "study" or to "develop sound study habits;" 26% of the eliminees, 32% of the successful students and 40% of the instructors having stated that this is the advice they would give. A substantial number of successful students and instructors placed importance on keeping up with the coursework and getting the basic phases (i.e., AE and NP) "down

TABLE 13

Response to Interview Questions
"Did You Feel Properly Prepared for UNT?"
(Students) and "Do You Feel Most Students
Are Properly Prepared for UNT?" (Instructors)

Response	SIEs N=47	ACAD N=16	FD N=9	MOA N=8	MED N=11	All Eliminees N=91	Successful Students N=219	Instructors N=106
Yes	49	19	33	75	73	47	67	45
No	49	81	67	25	27	52	29	53
Can't Say	2	-	-	-	-	1	4	2

cold." The fact that a relatively small percentage of eliminees made these suggestions may be due to the fact that many eliminees had not progressed far enough into the program to attach the same importance to these phases as did the successful students or the instructors. For those eliminees who had progressed further, it is possible that they either did not have the necessary insight or they may have been denying that they had not studied enough during these basic phases.

The table also illustrates that there were a few suggestions the eliminees made to a greater extent than did the other two groups. Specifically these were to be sure you really want navigation as a career field, to expect stress and competition, and finally to be prepared for UNT (e.g., know what you are getting into, know how to take "ATC type" tests, know about navigation as a career, etc.).

A final point of interest is that 17% of the successful students, 8% of the instructors and 5% of the eliminees made the suggestion to take it easy and do not become discouraged. The feeling of many of these students and instructors was that students who failed or did poorly on a test early in the program would get quite discouraged. These students would then feel that they had lost their chance for a good operational assignment due to the competitive nature of these assignments. The end result is that they would lose their motivation to do well in the future. This problem might be alleviated by placing less emphasis on early grades as determinants of assignments.

TABLE 14

Percentage of Eliminees, Successful Students and Instructors That Would Make Particular Suggestions to Students Just Entering UNT

Suggestion	Response Percentage (%)		
	Eliminees N = 91	Successful Students N = 219	Instructors N = 106
Study and/or develop good study habits	26	32	40
Be sure you want it	14	2	1
Be prepared for UNT	21	6	1
Expect pressure and competition	3	-	-
Get extra help	4	6	17
Keep up	4	18	17
Get basics	12	22	35
Take it easy - Don't get discouraged	5	17	8
Be prepared prior to presentation of material and/or flying	-	6	9
None - Don't know	16	2	1
Other	21	22	22
Not Applicable	2	-	-

There were a number of "other" comments made regarding suggestions for new students. However, they were ones that were unique to particular individuals and not expressed by enough students to warrant further discussion.

Influence of Element Leaders and Section Leaders. The percentage of eliminees and successful students that perceived the influence of their element leaders as positive, neutral (little or no influence), or negative are shown in Table 15. Excluded from the analysis were students that stated the question was not applicable (they eliminated too early to feel they were in a position to judge). Also excluded were those that had more than one element leader and gave different estimates of the influence of each.

TABLE 15

Influence of Element Leaders on Training
As Perceived by Eliminees and Successful Students

	Response Percentage	
Type of Influence	Eliminees N = 77	Successful Students N = 212
Positive	36	49
Little or none	57	43
Negative	6	8

Only a slightly smaller percentage of eliminees than successful students viewed the influence of their element leader as negative. However, a considerably larger percentage of eliminees than successful students felt their element leader had little or no influence, and a considerably smaller percentage of eliminees than successful students viewed their influence as positive. Though differences do appear to exist, a statistical test (χ^2) revealed that the differences in proportions of eliminees and successful students in each category were not significant ($\chi^2 = 4.35$, $df = 2$, $p < .20$). Regardless of this later finding, it remains a fact that less than half of successful students and only 36% of the eliminees viewed their element leader's influence as positive. This certainly points out a need for some improvement in this area. To

the extent that one of the responsibilities of an element leader is to influence training, it seems they should play a positive role in a future navigator's experience at UNT. Fortunately, only a small number of both eliminees and successful students perceived the influence of their element leader as being negative.

Table 16 shows corresponding percentages of eliminees and successful students that responded in a positive, neutral, or negative fashion when asked about the influence of their student section leader on their training. Excluded from the analysis were students who stated that the question was not applicable (they either eliminated too early to judge or were section leaders themselves), and those who had more than one section leader and had mixed reactions to each. The majority of both the eliminees and the successful students saw their section leaders as having little or no influence, while most of the remaining saw them as having a positive influence. Only 5% of the successful students and none of the eliminees viewed their influence as negative. The differences in the eliminee and successful student groups were not statistically significant ($\chi^2 = 5.88$, $df = 2$, $p < .10$).

TABLE 16

Influence of Section Leader on Training
As Perceived by Eliminees and Successful Students

	Response Percentage	
Type of Influence	Eliminees N = 82	Successful Students N = 189
Positive	33	40
Little or none	67	55
Negative	-	5

The relevance of these findings regarding section leader influence on the overall attrition problem is questionable. It appears that the section leader's role at present is largely administrative, and is assigned solely on the basis of rank. However, it was the impression of the investigators that the better section leaders were those students that had been nonrated officers prior to UNT (usually 1st Lieutenants or Captains). These officers, by virtue of their

experience with the Air Force and maturity, seemed to be sought out more for advice and help. They were usually more able to provide accurate information of what Air Force life would be like after completion of UNT, and to explain the pros and cons of various operational commands and assignments.

Seeking of Advice, Help, Counseling or Remedial Training. Interviews with eliminees indicated that 73% sought advice, help, counseling or remedial training. On the other hand, only 37% of the sampled successful students sought help or advice. A further breakdown of the eliminees by type indicates that 68% of the SIEs, 100% of the academic and flying deficiency eliminees, 62% of the MOAs, and 36% of the medical eliminees sought advice or help. The figure of 100% for the academic and flying deficiency eliminees is not surprising since a student that fails a test or flight check is required to meet with his element leader. Table 17 indicates, for those who sought counseling or help, the job title of the person(s) they saw. In many cases a student would seek help from more than one source and therefore the percentages sum to more than 100. Instructors appear to be the main source of help or advice for both eliminees and successful students. The second most frequent source of help was the element leader, followed by other students and/or friends.

The instructors were questioned as to the availability of help, advice, counseling or remedial training. The percentage of instructors that cited each listed source of help or advice are shown in Table 18. An examination of the responses of the instructors indicates that ninety-four percent stated that instructors were always available for help, and 52% indicated that element leaders were a prime source of help. Instructors also cited two sources of help that were seemingly not utilized by students, namely the class advisor and the learning center.

The class advisor is a line instructor who is assigned to a particular UNT class, ostensibly to serve as a nonauthoritarian confidant to the students. He should be someone they can talk freely and frankly with, or seek help and advice from without fear of any repercussions. This would seem to be an important service and one that students would take advantage of. Yet, only 1% of the eliminees and 8% of the successful students that sought help stated that they did so from the class advisor. Perhaps the role of the class advisor needs to be more clearly defined for both the advisors and the students. Also, the class advisor may need to make himself more visible, assure his students that they can confide in him, and make it known that he is simply there to be of help.

TABLE 17

Percentage of Eliminees and Successful Students
That Sought Help, Advice or Counseling
From a Particular Source*

Job Title of Person from Whom Help Was Sought	Percentage*						
	SIE N=3	ACAD N=16	FD N=9	MOA N=5	MED N=4	All Eliminee Groups N=67	Successful N=80
Instructor	45	88	89	40	50	61	76
Element Leader	40	19	33	40	25	33	21
Other Students/ Friends	15	69	22	20	--	28	20
Class Advisor	3	--	--	--	--	1	1
Chaplain/Flight Surgeon	18	6	--	40	50	12	1
Learning Center	3	--	--	--	--	1	8
Other	18	--	11	20	--	12	4

*Percentages computed from the number (N) that sought help

TABLE 18

Percentage of Instructors that Cited A Particular Source
Of Help, Advice or Counseling as Being Available

Job Title of Person from Whom help Was Sought	Percentage (N = 106)
Instructur	94
Element Leader	52
Other Students/Friends	9
Class Advisor	23
Chaplain/Flight Surgeon	9
Learning Center	37
Other	11

Considering the expense of developing, operating and maintaining the learning center, it seems wasteful that only 1% of the eliminees and none of the successful students that sought help or advice utilized it for remedial help. A small scale investigation into the reasons why may be in order. From this investigation, the specific complaints students have about the learning center and suggestions they may have for improving it might be determined. It is also possible that it is not publicized enough, that students are not even aware that it can help prepare them academically and provide remedial help.

Discrimination in the Air Force and UNT. Table 19 shows the proportion of eliminees, successful students, minority students, nonminority students, and instructors that perceived discrimination of one type or another within the Air Force in general and UNT. There appear to be no differences between the various student groups in terms of the extent to which they perceived discrimination. However, instructors tended to more frequently report that they had seen discrimination in both the AF and UNT than did students.

It must be emphasized that the data in Table 19 simply indicates the proportion of each group that responded "yes" and "no" to the question: "Have you seen discrimination in the AF (UNT)?" The data in the table do not reveal the nature of the discrimination, or toward what group the discrimination was directed. Attention has been called to this point since it was discovered upon further questioning that many of those who stated there was discrimination in the AF and UNT indicated that it was, in fact, what they chose to label as "reverse discrimination." As they viewed it, rather than being discriminated against, minority (black) students were often given preferential treatment. A few nonminority academic eliminees were quite incensed that minority group students were given more chances than they were (e.g., allowed to fail more tests before being academically eliminated). One minority student even stated that he felt this form of "discrimination" existed.

The percentage of each group that perceived "reverse" discrimination (favoring blacks) and true discrimination (favoring whites) are indicated in Table 20. The most striking thing about the data shown in the table is that while 16% and 12% of the eliminees perceived reverse discrimination in the Air Force and UNT, respectively, only 1 and 2% perceived true discrimination. Additionally, instructors were more apt to perceive reverse discrimination than true discrimination. Successful students, on the other hand, perceived slightly more true discrimination than reverse discrimination, and only one black student (2% of the total) stated he perceived reverse discrimination.

TABLE 19

Perceived Discrimination in the Air Force and UNT

	PERCENTAGE THAT STATED PRESENCE OR ABSENCE OF DISCRIMINATION											
	ELIMINEES N = 91		SUCCESSFUL STUDENTS N = 219		MINORITY STUDENTS N = 41		NON-MINORITY STUDENTS N = 269		ALL STUDENTS N = 310		INSTRUCTORS N = 106	
RESPONSE	AF	UNT	AF	UNT	AF	UNT	AF	UNT	AF	UNT	AF	UNT
Yes	37	28	31	27	37	34	33	27	30	28	43	48
No	63	71	69	73	63	66	67	73	70	72	57	52

TABLE 20

Type of Discrimination Perceived

TYPE OF DISCRIMINATION	PERCENTAGE THAT PERCEIVED EACH TYPE OF DISCRIMINATION											
	ELIMINEES N = 91		SUCCESSFUL STUDENTS N = 219		BLACK STUDENTS N = 41		WHITE STUDENTS N = 269		ALL STUDENTS N = 310		INSTRUCTORS N = 106	
	AF	UNT	AF	UNT	AF	UNT	AF	UNT	AF	UNT	AF	UNT
Reverse Discrimination Favoring Blacks	16	12	3	5	-	2	8	8	7	7	11	16
True Discrimination Favoring Whites	1	2	9	6	29	24	3	2	7	5	8	3

The data shown above indicate that discrimination as we traditionally know it is probably a small problem within the UNT community. However, the data reveal an awareness of reverse discrimination. Although noble motives are involved in providing every opportunity for minority students to succeed in navigator training, training managers should be well aware of the impact on the morale of nonminority students if unfair allowances are made.

Suggested Changes in the UNT Program. Listed in Table 21 are the most frequent responses to the question "What would you change in UNT?," along with corresponding percentages of the eliminees, successful students and instructors that gave each response.

Upon close examination of the table, one can see that there is at least one change that was suggested by a relatively large percentage of each group and by a considerably lower percentage of the other two groups. In the case of eliminees, it is the suggestion for a better briefing and orientation prior to a student's entrance into the UNT program. Twenty percent of the eliminees suggested this change, while only 6% and 1% of the successful students and instructors, respectively, mentioned this. Presumably they feel that if they know more about it they either would have chosen not to enter the program, or they would have been able to better adjust to and accept the program once they were enrolled. This suggestion is related to a previously cited finding, specifically that a relatively small percentage of students actually knew what UNT would be like.

A relatively large proportion of successful students suggested two changes in UNT that stand out when compared with the relative proportion of eliminees and instructors that suggested them. The first of these was to improve scheduling. A full 25% of the successful students suggested this, while only 10% of the instructors and 7% of the eliminees did so. Recall that the present system of scheduling was cited by a large percentage of both successful students and instructors as a displeasing aspect of UNT. The scheduling problems mentioned centered around the uneven work load both within and between the various phases. Many students who were nearing graduation remembered the extremely rapid pace that was set early in the program and noted that they had large blocks of free time during the last month of training. Naturally, they questioned the efficiency and purpose of this.

Another change that a large percentage of successful students (15%) suggested, but was suggested by a relatively smaller percentage of eliminees (7%) and instructors (2%), was to standardize the grading of check rides. Many felt that a check ride grade was to some extent

TABLE 21

Percentage of Eliminees, Successful Students
and Instructors that Suggested Particular Changes in UNT

Suggested Change	Response Percentage (%)		
	Eliminees N = 91	Successful Students N = 219	Instructors N = 106
Slow course down	21	6	16
Better briefing and orientation	20	6	1
Improve and standardize instructor performance	7	15	2
Revise specific phases	9	24	25
Emphase flying and performance in aircraft more	5	5	5
Relax military regulations	4	-	1
Improve scheduling/spread out program more evenly	7	25	10
Improve grading systems	3	11	6
Improve equipment	2	7	4
Better coordination between flying and academics	2	8	4
Change course for foreign students	-	-	4
Individualize instruction	1	3	9
More operational orientation in UNT	5	9	21
Improve instructor attitudes toward and treatment of students	4	3	3
Improve physical training program	1	6	2
Eliminate FM 33	1	1	2
Standardize grading of check rides	5	19	4
Improve academic tests	1	6	2
Other	33	18	40
Cannot say/Nothing	5	5	5
Was not asked question	3	-	-
Not applicable	2	-	-

"luck" depending on the weather conditions at the time of the ride and the particular instructor one had. Some of these students even went so far as to state that they felt lack of standardization was responsible for a certain proportion of flying deficiency eliminations. Presumably, the reason eliminees did not make this suggestion to as great an extent as successful students was that many had not gotten far enough along into the program to observe the full extent of the problem. Instructors, on the other hand, probably did not make this suggestion to the same extent because they were part of the problem and believed that they were as objective as possible in grading students. It is interesting, however, that 4% of the instructors did recognize this problem.

A suggested change that a relatively large percentage of instructors (21%) made, relative to the percentage of eliminees (5%) and successful students (9%), was to give UNT a more operational orientation. The belief is that students while in the UNT program don't really get to see what the "real world" of navigation is like. Further, many believe that UNT presents very few of the positive aspects of navigation and too many of the negative aspects. A comment by one instructor sums up what has been said on this issue, and additionally illustrates the impact on attrition produced by this lack of an operational orientation. He believed that "many students "SIE" because they don't understand the role of a navigator and how what they learn in UNT fits in with what they will be doing as operational navigators."

Another suggested change, made by 5% of all three groups, is related to this previous issue of "operationalizing" UNT. Specifically, this was to emphasize flying and performance in the aircraft more than is presently being done. The feeling among those who suggested this change is that there is too much emphasis on theory, and that the flying aspects of the program suffer because of this. However, it is important to note that recent emphasis on behavioral objectives in the navigator training program, may already have alleviated this problem.

A comment made by a number of instructors highlights the previous two suggested changes. They felt that students should be allowed to do more work on their own when in the air. Instructors hovering over students to an extreme degree may not be conducive to developing a sense of confidence, a trait that is apparently a characteristic of a competent navigator. More solo missions for students may be a means of developing this confidence.

Another suggested change made by a substantial number of successful students was to improve and standardize instructor performance (particularly in the air). This suggested change is obviously related to

standardization of the grading check rides. Many students observed that instructors sometimes differ in their navigational techniques and pass these on to students. This creates a confusing situation for students, and a student might be marked down on a check ride by one instructor for using a technique another instructor taught him on a practice mission.

Twenty-one percent of the eliminees and 16% of the instructors suggested slowing the course down, but only 6% of the successful students suggested this change. In fact, this was the most frequently suggested change made by eliminees. On the other hand, a number of students felt that the program was too slow. They suggested shortening the course because it gets boring at this slow pace. This discrepancy argues for an individualization of instruction of at least some parts of the program. Table 21 shows that 9% of the instructors, 3% of the successful students, and 1% of the eliminees suggested just that.

Nine percent of the eliminees, 25% of the successful students, and 25% of the instructors suggested changes in specific phases that they thought would be beneficial. Some examples of these phase specific recommendations are: "more emphasis on NP," "eliminate the low level navigation phase," "have navigators teach weather," and "reinstate the cross-country flight." There seems to be no general agreement on suggested changes for the phases and a number of contradictions were encountered. An example of such contradictions was that one student suggested placing more emphasis on NP while another suggested deemphasizing this phase.

Successful students also placed some emphasis on improving the grading systems procedures. It is necessary to differentiate this suggested change from the previous one regarding the standardization of the check rides. The specific changes that were included within this more general suggestion had to do with things such as the relative importance of academic tests versus check rides and determination of final class standing. A number of students pointed out that although there are only four check rides, they are heavily weighted in the final grade. It was suggested that there be more check rides. This would help the normally capable student who may have had a "bad day" or unusual conditions the day of his check ride from being penalized too heavily. In fact, some students actually felt that some Flying Deficiency eliminations were actually due to "bad luck." For example, if the weather conditions were adverse a student's grade might be lower than it would have been under more favorable conditions. Other students wanted less emphasis placed on academic tests. Some wanted to reduce the competition in UNT by not having class standing count toward operational assignments. They felt this would relieve the "test anxious"

students of some of their anxiety and actually enable them to perform better.

A final suggested change that will be discussed was made by a few from each group, namely, better coordination between academics and related flight missions. They pointed out that often students are studying one type of navigation in the classroom while still flying missions from a previous phase of UNT.

3.1.4 Minority group interview data. A total of 41 minority students, five of whom were eliminees, were interviewed. Previous analyses of interview items treated successful minority (black) students solely as successful students, and similarly minority group eliminees were considered as purely eliminees. The relatively small size of the minority group sample made it difficult to draw separate conclusions for minority students. However, it still may be useful to examine and discuss the minority students' responses to selected interview items.

One of the differences between the minority students and nonminority students, specifically, feeling about discrimination in the Air Force and UNT, have been discussed in Section 3.1.3.

Approximately 68% of the minority group stated they sought some kind of help or counseling, a higher percentage than UNT students in general (43%). Additionally, it appears that a slightly higher percentage of minority students (22%) than nonminority students (17%) did not know what UNT would be like. Additionally, a smaller percentage of minority group students (46%) than nonminority group students (64%) felt properly prepared for UNT.

The percentage of minority and nonminority students that received commissions from the three major sources (OTS, ROTC and AFA) do not appear radically different. Of the minority students, 60%, 24% and 15% received commissions from OTS, ROTC and AFA respectively, while 55%, 36% and 7% of nonminority students received commissions from OTS, ROTC and AFA respectively. The percentage of minority students that were pilot eliminees (22%) is almost the same as the percentage of nonminority students (21%). One slightly surprising finding is that 43% of the minority students had college majors classified as technical in nature, while only 27% of nonminority students majored in this type of area. Fewer minority students (31%) than nonminority students (42%) stated they had extensive mechanical experience. The same held true for their statements regarding extensive athletic experience, with 51% and 61% of the minority students and nonminority students stating that they had such experience.

3.2 Test data.

3.2.1 Description of analyses.

Student Regression Analyses. The primary type of statistical analysis used on the student test data was multiple regression (or multiple correlation). A multiple correlation is a measurement of the strength of the relationship between an unmodified dependent variable (or "criterion"), and several independent or "predictor" variables that are weighted so that the correlation is at a maximum for the particular sample of observations used in its computation. The value of the multiple correlation coefficient (R) can vary from .00 (indicating no relationship) to 1.00 (indicating a perfect relationship). An indication of the predictive power of the correlation coefficient is obtained by squaring it (R^2). The obtained value, appropriately called the coefficient of determination, represents the percentage of the variance of the criterion variable that can be accounted for, or determined by, the predictor variables.

For the present investigation, several measures of ability, personality, motivation, interest, attitude and affect were obtained from students and used as predictors in the multiple regression analyses. UNT outcome statuses were used as the dichotomous criterion variables; each student was successively classified as eliminated or successful, SIE or other, Academic Eliminee or other, etc. (see Table 22). The strength of the association between the separate predictor and criterion variables was determined, and the effects of the predictor variables added up until the maximum value of the correlation was obtained. Separate regression analyses were calculated from data derived from the cross-sectional and longitudinal samples.

Table 23 shows the specific predictor variables entered into the analyses, accompanied by a short explanation of the meaning of the scores for each one. These particular predictor variables were chosen because of their apparent relevance to the study of UNT attrition, as well as their ability to represent different types of behavioral traits and processes that influence elimination.

The AFOQT, primarily an ability and achievement measure, is the instrument that has been traditionally used to select candidates for navigator training. The officer and navigator composite scores from

TABLE 22

Student Criterion Variables

Criterion
Success vs. Eliminees
SIE vs. Others
Academic Eliminees vs. Others
Flying Deficiency Eliminees vs. Others
MOA - Medical Eliminees vs. Others

TABLE 23

Variables Used in Regression Analyses
Predictor Variables

I. Personality Measures

Sixteen Personality Factor Test (16PF)	Source Traits	Explanation of Source Traits*
Factor A.	Reserved vs Outgoing	Low scores indicate detached, critical, aloof, stiff individuals. High scorers are warmhearted, easygoing, participating.
Factor B.	Dull vs Bright	Low scores indicate tendency toward concrete thinking and lower scholastic mental capacity. High scorers tend to be abstract thinking, bright, and have higher scholastic mental capacity.
Factor C.	Affected by Feelings vs Emotionally Stable	Low scorers tend to have lower ego strength, become easily upset. High scores indicate higher ego strength, calmness, maturity, reality-orientedness.
Factor E.	Humble vs Assertive	Low scores indicate mild, accommodating, conforming, submissive individuals. High scorers are independent, agressive, competitive, stubborn, dominant.
Factor F.	Sober vs Happy-Go-Lucky	Low scores indicate prudent, serious, taciturn persons. High scorers on this trait are impulsive, lively, enthusiastic.
Factor G.	Expedient vs Conscientious	Low scorrs indicate tendency to evade rules, to fulfill few obligations. High scores indicate persevering, staid, rulebound individuals.
Factor H.	Shy vs Venturesome	Low scorers are restrained, diffident, timid. High scores indicate uninhibitedness, spontaneity, social boldness.
Factor I.	Tough Minded vs Tender Minded	Low scores indicate self-reliant, realistic, no-nonsense types of individuals. High scorers are dependent, overprotected and sensitive.

TABLE 23 (Continued)

1. Personality Measures (Continued)

Sixteen Personality Factor Test (16PF)	Source Traits	Explanation of Source Traits*
	Factor L. Trusting vs Suspicious	Low scorers are adaptable, free of jealousy, easy to get along with. High scores indicate self-opinionated, hard to fool individuals.
	Factor M. Practical vs Imaginative	Low scores indicate careful, conventional, proper individuals that are regulated by external realities. High scorers tend to be wrapped up in inner urgencies, are absent-minded and careless of practical matters.
	Factor N. Forthright vs Shrewd	Low scorers are natural, sentimental and artless. High scorers are shrewd, calculating, worldly, penetrating.
	Factor O. Self-Assured vs Apprehensive	Low scores indicate self-assured, confident, serene individuals. High scorers tend to be worrying, depressive, troubled individuals.
	Factor Q1. Conservative vs Experimenting	Low scorers are tolerant of traditional difficulties and tend to respect established ideas. High scores indicate critical, liberal, analytical, free-thinking types of individuals.
	Factor Q2. Group Dependent vs Self-Sufficient	Low scores are indicative of "joiners" and "sound followers." High scorers are self-sufficient, resourceful, prefer their own decisions.
	Factor Q3. Undisciplined vs Controlled	Low scorers are careless of protocol, tend to follow their own urges. High scorers are socially precise and have strong control of emotions and general behavior.
	Factor Q4. Relaxed vs Tense	Low scores indicate tranquil, torpid, unfrustrated individuals. High scores indicate frustrated, driven, overwrought persons.

TABLE 23 (Continued)

I. Personality Measures (Continued)

Sixteen Personality Factor Test (16PF)	Source Traits	Explanation of Source Traits*
Factor Q II	Low Anxiety vs High Anxiety	low scorers tend to have lives that are generally satisfying, and tend to achieve goals they set for themselves. Extremely low scores, however, may indicate lack of motivation. High scores indicate some type of maladjustment; an inability to meet life's demands and to achieve desired goals.

*Descriptions of the source traits for the 16PF were taken from the manual for this test (Institute for Personality and Ability Testing, 1972: 17-22).

TABLE 23 (Continued)

II. Motivational Measures

Motivational Analysis Test	Scores on Dynamic Traits	Explanation of Scores**
	Career Integrated Motivation	High scores show overt interest, ambition and realistic involvement in the mature role. Low scores suggest regressive behavior and unwillingness to accept responsibility.
	Fear Integrated Motivation	High scores indicate strong tendencies toward caution. Low scorers tend to be haphazard and casual.
	Self-Concept Integrated Motivation	High scores suggest motivation toward self-awareness and self-realization. The low scorer is usually an underachiever in all areas, is unwilling to defer gratification, and is rigid and defensive.
	Assertiveness Integrated Motivation	A high score is indicative of the need to be conspicuously rich. Low scorers are uninterested in economic competition.
	Career Unintegrated Motivation	High scores indicate high aspirations and tension toward being successful in work life. A low score reflects disenchantment with career involvement.
	Fear Unintegrated Motivation	Persons high on this score tend to have been recently exposed to problems that have eroded their confidence, are self-deprecating and see the world as threatening. Low scores are indicative of freedom from anxiety.
	Self-Concept Unintegrated Motivation	High scores indicate strong but unorganized concern for the future, and high aspirations that are often unrealistic. Low scores suggest unconcern for the self, a day-to-day orientation toward life with little investment of energy.
	Assertiveness Unintegrated Motivation	High scores indicate a desperate desire for material symbols of success. Low scores indicate absence of this characteristic.

**Explanations of the dynamic traits for the MAT were taken from the manual for this test (Sweney, 1969: 6-15).

TABLE 23 (Continued)

III. Achievement and Ability Measures

Air Force Officer's Qualifying Test (AFOQT)	Source Traits	Explanation of Source Traits
	Navigator Composite	The instrument traditionally used for selection of candidates for navigator training. The Navigator Composite is made up of the Quantitative Aptitude, Scale Reading, Aerial Landmarks, General Science, Mechanical Information, and Mechanical Principles subtests (AFPT 951, 953, and 954).
	Officer Composite	The Officer Composite is comprised of Quantitative Aptitude, Verbal Aptitude and Officer Biographical Inventory Subtests (AFPT 951 and 952).

IV. Attitude Measures

	Importance-Possibility Scale	A measure of motivation toward establishing a career in the Air Force. High scores indicate positive motivation toward this goal.
	Attitude Toward Navigation (Navigation Career Scale)	A scale that assesses the magnitude and direction of attitudes toward navigation as a career field. High scores indicate positive attitude.
	Attitude Toward Military (Military Career Scale)	A test of attitudes toward military life in general. High scores indicate positive attitude.
	Job Satisfaction Scale	A measure of attitudes toward instructing UNT classes. High scores indicate positive attitude.

V. Affective Measures

	Trait Anxiety Inventory	A test that attempts to identify individuals who are consistently prone to experience anxiety. High scores indicate greater tendency toward this predisposition.

TABLE 23 (Continued)

VI. Measures of Interest

Strong Vocational Interest Blank (SVIB)	Source Traits	Explanation of Source Traits*
	Air Force Officer Scale	A scale indicating the similarity of an individual's interests to those of a criterion group of 8,000 Air Force officers.
	Academic Achievement Scale	A scale that attempts to identify interest patterns associated with good scholarship. High scores are predictive of eventual high educational achievement.
	Diversity of Interests	Measures breadth of interests. High scores indicate likings for a number of unrelated activities. Air Force officers tend to score high on this scale. (Campbell, 1969: 19)
	Masculinity-Femininity Scale II	Contrasts interests of men and women working in the same occupations. Educated men score toward the feminine end because of their interest in cultural activities. Low scorers tend to like art and music, working indoors; etc., activities traditionally ascribed as "feminine in this society.
	Occupational Introversion-Extroversion	Scores on this scale indicate a "thing vs people" dichotomy. High scores are found among scientific and skilled trade occupations; low scores were found among occupations requiring a great deal of face-to-face contact with others.

*Description of the scales from the SVIB were taken from the manuals for this test (Strong, 1966 and Campbell, 1969).

this test were forced into the preliminary regressions,[1] and variables from other domains were then allowed to enter. In this way, an attempt was made to determine which variables improved the utility of the conventional ability and achievement-oriented selection devices. However, it was thought highly probable that the predictive power of the AFOQT scores was already exhausted, since they were used as screening devices for the admission of candidates to UNT. An examination of the validity coefficients for the AFOQT composites (see Table 24) showed that this may have been the case; the majority of the correlations are low and not significant. In order to determine the predictive power of the AFOQT composites in competition with other types of variables, a final regression analysis was performed in which AFOQT scores were not forced, but allowed to enter according to their power to predict success or elimination.

Personality factors also may impinge upon attrition because of the tendency of certain consistent behavior patterns to be incompatible with military life and navigator responsibilities. The source traits from the 16 PF were included in the analysis in order to assess the importance of these factors. The low intercorrelations of the traits from this test make it a good prospect for the regression analysis.

Motivational factors appear to be important determinants of the choice and attainment of a navigator career. Ambitions toward establishing a career and allied objectives were assessed through the inclusion of variables from the MAT in the analysis.

Interests that coincide with those of the successful navigator were thought to influence the amount of effort that a candidate put into his training. A student lacking interest in the tasks required of a navigator may eliminate regardless of the abilities he possesses to complete these tasks. Scores from the SVIB on various measures of interest were put into the analysis for these reasons.

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[1] Since AFOQT scores were unavailable for the Air Force Academy graduates included in the sample, some alternative method of deriving this ability-achievement information had to be found. It was decided that the distribution of class ranks converted to percentiles would provide an adequate substitute for AFOQT scores. It was assumed that Academy graduates would possess above average ability, so class ranks were converted to fiftieth through ninety-fifth percentile scores, and entered in place of the Officer and Navigator AFOQT composites.

TABLE 24

Validity Coefficients for AFOQT and Categories of Elimination

	Navigator Composite	Officer Composite
X Sectional Sample		
Eliminee/Successful	.107 (n.s.)*	.018 (n.s.)
SIE/Others	.104 (n.s.)	.073 (n.s.)
Academic/Others	.103 (n.s.)	.088 (n.s.)
Flying Deficiency/Others	.074 ($p < .01$)	.170 (n.s.)
MOA-Medical/Others	-.083 (n.s.)	-.074 (n.s.)
Longitudinal Sample		
Eliminee/Successful	.085 (n.s.)	.019 (n.s.)
SIE/Others	.017 (n.s.)	-.066 (n.s.)
Academic/Others	.067 (n.s.)	.071 (n.s.)
Flying Deficiency/Others	.059 (n.s.)	.051 (n.s.)
MOA-Medical/Others	.037 (n.s.)	.018 (n.s.)

*n.s. = not significant at .05 level

Attitudes toward military life in general and navigator training in particular were thought to be important determinants of the eventual outcome of navigator training. The Military-Navigator Career Scales and the Importance-Possibility Scale were included in the analysis in order to tap these attitudes.

The debilitating effects of anxiety upon academic performance, and the interest in identifying those students who would benefit from counseling designed to aid them in finishing training, indicated the need for a measure of anxiety to be used in the analysis. Scores from the Trait Anxiety Inventory were the affective variables used in the regression.

The selection of the particular variables to be entered into the regression composites from all of the potential variables listed in Table 23, was accomplished through use of the stepwise method (Biomedical Computer Program Series BMD02R). Essentially this method consists of first selecting the predictor variable that is most highly correlated with the criterion. At the second step, the variable that has the highest partial correlation with the criterion (the effects of the first predictor being partialed out), is entered. Statistical checks are made on the effects of the order of the entrance of variables into the equation, and a third variable that has the highest partial correlation (the effects of the first and second variables being partialed out) is entered, and so on. In short, use of this method results in a minimum of redundant predictor variables entered into the equation, thus providing a final multiple regression equation that consists of individual variables that uniquely predict UNT attrition.

Instructor Regression Analysis. A similar multiple regression analysis was computed from the instructor test data. For this sample, AFOQT composites used as predictors, and UNT outcome statuses used as criteria were naturally not relevant. In their stead are an additional attitude scale used as a predictor (Job Satisfication Scale), and a rating of each instructor by his immediate supervisor (element leader) used as the criterion measure. The Job Satisfication Scale (see Appendix A) consisted of items that attempt to measure how positively the individual feels toward the duties and rewards of instructing the UNT classes. The element leaders' rating form (see Appendix A) was a rating of instructors with regard to the subject matter they are presently teaching. It included items on knowledge of subject matter, relationships with UNT personnel and attitudes toward UNT. The obvious purpose of this analysis was to identify factors that predict instructor quality. The underlying assumption is that quality of instruction is inversely related to student elimination rates (i.e., if instructor performance improves, student attrition rates will decrease).

Analysis of Periodic Test Data for Longitudinal Student Sample. The Attitude Toward Instruction scale (see Appendix A) was designed to assess student attitudes toward various aspects of the instruction received during various phases of the program. It was administered at the end of the Aircraft Equipment (AE-27), Navigation Procedures (NP-19), Grid Navigation (GN-15), Overwater Navigation (OW-20), Night Celestial Navigation (NC-21) phases and also upon completion of UNT. The scores from these six administrations were subjected to a repeated measures analysis of variance. The results of this analysis were used to find if there were noticeable and significant changes in attitudes regarding the quality of instruction during the course of the program.

In order to find if there are fluctuating anxiety levels in response to changing conditions in content and methods of training, the State Anxiety Inventory (A-State) was administered prior to several critical examinations and check flights. The A-State was given immediately prior to the Aircraft Equipment examination, the Grid Navigation examination, the Day Celestial check ride, the Overwater Navigation check flight, and the Grid Navigation check flight.

The scores from this state affective measure were entered into a repeated measures analysis of variance in order to assess if there were significant shifts in state anxiety over the course of instruction.

The Military-Navigator Career Scales. Attitude scales were given at the beginning and end of UNT for successful students, and at the beginning of UNT and point of elimination for eliminees. The two scores for each group were subjected to a t-test for correlated means in order to find if overall career attitude changed during UNT.

A t-test was also run on the means of eliminee and successful student attitudes at the very beginning of UNT to see if there were significant differences between the two groups. A final t-test was run to compare the attitudes of the eliminees held at the point of their elimination and the attitudes of the successful students upon completing the program.

3.2.2 Reliability of regression analyses. The eight month span in which cross-sectional data was collected yielded sixty-six eliminees in total; sixty-three of these students completed testing and their scores were entered into the regression analysis. Broken down by elimination type, there were 36 SIEs (54% of total eliminees), 10 Academic eliminees (15% of total eliminees) 5 Flying Deficiency eliminees (8% of total eliminees) and 15 Medical - MOA eliminees (23% of total eliminees). These strata are comparable to percentages of elimination type given for fiscal year 1973. In spite of the representativeness of the sample by strata, the sample as a whole is small in comparison to the successful student sample and thus is potentially subject to sampling error. Appendix 1 shows the means, standard deviations and standard errors for the variables entered into the regression analysis for eliminees and successful students. The large standard errors associated with the eliminees indicate that the scores for this group were, in fact, subject to a great amount of sampling error, and thus the regression analyses derived from these data were somewhat biased by the idiosyncrasies of the particular eliminees included in the analyses.

The most reliable estimates of the specific variables typically associated with eliminated students would come from the successful student vs. eliminee regression, since the maximum number of eliminees was included in this composite. Following in reliability were the SIE, Academic, Medical - MOA and finally Flying Deficiency regressions.

The longitudinal sample yielded an even smaller number of eliminees than did the cross-sectional sample. Altoghether, only 25 students eliminated from the 6 longitudinal classes. Of these students, there were 11 SIEs (44% of total eliminees), 6 Academic eliminees (24% of total), 4 Flying Deficiency eliminees (16% of total), and 4 Medical - MOA eliminees (16% of total). These very small numbers of eliminees made the individual variables subject to even more sampling error than was the case for the cross-sectional sample. For this reason, the resulting regressions were even more biased by the idiosyneracies of the eliminees in the sample. Again, the most reliable results were obtained from the successful student vs. eliminee regression. The SIE regression was the next in reliability, followed by the Academic eliminee regresssion. The regressions for Flying Deficiency eliminees and the Medical - MOA were the least reliable.

The original intent of the regression analysis was to cross-validate results obtained from the cross-sectional regression with data obtained from the longitudinal sample. In other words, those variables that were found to significantly predict attrition for the cross-sectional sample were to be entered into a regression analysis using the longitudinal data, and the shrinkage in the multiple correlation noted. The general purpose of such an analysis would be to find how comparable results of a regression analysis derived from one sample are to similar samples drawn from the sample population.

The smaller number of eliminees obtained from the longitudinal sample indicated that cross-validation would not be warranted in this case; the two samples were not similar enough in composition for a cross-validation to be meaningful. As an additional check on the similarity of the two samples, t-tests were calculated between the means of the variables for eliminees and successful students in the cross-sectional and longitudinal samples (see Appendix F). The results of the t-tests indicate statistically significant references to exist between variables in the majority of cases for the cross-sectional and longitudinal successful student samples. Statistical significance between variables was not found often in the comparison of cross-sectional and longitudinal eliminees; however, this may be a function of the sample sizes of these two groups. Cross-validation between the statistically divergent successful student samples was clearly not warranted, and so the analysis was not performed.

3.2.3 Regression Analyses. The variables found to be significant at the .05 level (or better) for the final regression analyses are listed in Table 25 according to criterion variables and the samples from which they were derived. This section will discuss the significance of each of the variables with regard to the category of elimination to which it relates, its relationship to other significant variables, and the relationship of the two samples. As was mentioned previously in the Section 3.1.4, all analyses must be interpreted in the light of the number of eliminees entered into the regression.

Eliminees vs. Successful. Table 26 presents the results of the cross-sectional sample regression analysis using simply elimination vs. success as the criterion. For the cross-sectional sample, this general criterion had the highest final multiple R, and thus the best predictive success. The majority of the variance for this category (14.02%) was predicted by the Attitude Toward Navigation Scale. Since the majority of the eliminees were administered this scale at the time of their elimination, and since this scale obviously has the ability to tap negative attitudes toward various aspects of the navigator career field (see Section 3.2.4: Item Analysis of Attitude Scales), it is not surprising to find it a strong predictor. The regression coefficients show that high scores (favorable attitudes) on this scale are associated with successful status in UNT. This variable was significant at the .01 level.

An additional 3.8% of the variance of the criterion variable was predicted by scores on Factor A - Reserved vs. Outgoing, from the 16 PF. High scores on this factor tend to be associated with elimination. The more easy-going nature of an individual scoring high on this factor may make him less apprehensive about resigning from training, feeling more open to other career opportunities. In contrast, the more rigid character of a low-scorer may predispose him to be less compromising, and thus willing to continue training in spite of his dissatisfactions. This factor was significant at the .01 level.

Another smaller portion (1.3%) of the variance was predicted by Career Integrated Motivation; this variable was significant at the .05 level. High scores on this factor tend to be associated with successful status. This sentiment is measured by attitudes toward "learning technical skills" and keeping a job", and is a function of the work experience an individual has already had (Sweney 1969:6). The technical nature of UNT as well as the amount of commitment needed to keep up with the program makes this variable a relevant predictor for this category. This motivational measure was significant at the .05 level.

TABLE 25

Significant Variables Entered Into the Multiple Regression Equations for Cross-Sectional and Longitudinal Samples

CRITERION VARIABLES	CROSS SECTIONAL SAMPLE	LONGITUDINAL SAMPLE
Eliminees vs. Successful	(1) Attitude Toward Navigation (2) Factor A Reserved vs. Outgoing (16 PF) (3) Career Integrated Motivation (4) Factor Q3 Undisciplined vs. Controlled (16 PF) (5) Assertiveness Unintegrated Motivation (MAT)	(1) Career Integrated Motivation (2) Masculinity - Femininity Scale (SVIB)
SIEs vs. Others	(1) Attitude Toward Navigation (2) Factor A Reserved vs. Outgoing (16 PF) (3) Factor Q II Low Anxiety vs. High Anxiety	(1) Diversity of Interests Scale (SVIB) (2) Factor O Self-Assured vs. Apprehensive (16 PF) (3) Trait Anxiety Inventory (4) Importance Possibility Scale
Academic Eliminees vs. Others	No variable was found to be significant.	(1) Factor B Dull vs Bright (16 PF) (2) Factor G Expedient vs Conscientious (16 PF) (3) Factor Q1 Conservative vs. Experimenting (16 PF) (4) Air Force Officer Scale (SVIB) (5) Occupational Introversion - Extroversion (SVIB)
Flying Deficiency Eliminees vs. Others	(1) AFOQT - Officer Composite (2) Assertiveness Unintegrated Motivation (MAT) (3) Factor A Reserved vs. Outgoing (16 PF)	No variables were found to be significant .
Medical - MOA Eliminees vs. Others	(1) Trait Anxiety Inventory (2) Attitude Toward Navigation (3) Fear Integrated Motivation (MAT) (4) Factor I Tough vs. Tender Minded (16 PF)	(1) Trait Anxiety Inventory (2) Fear Integrated Motivation (MAT) (3) Masculinity - Femininity Scale (4) Diversity of Interests Scale

TABLE 26

Summary of Regression Analysis for Cross-Sectional Students
Criterion Variable: Successful vs Eliminees
(AFOQT Not Forced)

STEP NUMBER		VARIABLE ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENT
1	**29	Attitude Toward Navigation	0.3745	0.1402	0.1402	0.23473
2	** 1	Factor A. Reserved vs Outgoing	0.4233	0.1792	0.0390	-0.01635
3	*22	Career Integrated Motivation	0.4304	0.1922	0.0130	0.02778
4	*15	Factor Q3. Undisciplined vs Controlled	0.4527	0.2049	0.0124	-0.02628
5	*21	Assertiveness Unintegrated Motivation	0.4698	0.2207	0.0162	0.03237
6	27	AFOQT-Officer Composite	0.4809	0.2313	0.0106	0.00191
7	30	Trait Anxiety Inventory	0.4915	0.2416	0.0103	0.11456
8	35	Diversity of Interests Scale	0.4987	0.2487	0.0071	-0.00669
9	33	Air Force Office Scale	0.5124	0.2626	0.0138	0.00909
10	8	Factor I. Tough Minded vs Tender Minded	0.5200	0.2704	0.0078	0.02934
11	28	Importance Possibility Scale	0.5251	0.2757	0.0053	0.00584
12	18	Career Unintegrated Motivation	0.5295	0.2804	0.0047	-0.01655
13	14	Factor Q2. Group Dependent vs Self-Sufficient	0.5322	0.2833	0.0029	-0.01927
14	19	Fear Unintegrated Motivation	0.5346	0.2858	0.0025	0.01588
15	11	Factor N. Forthright vs Astute	0.5371	0.2884	0.0027	-0.01473
16	34	Academic Achievement Scale	0.5391	0.2906	0.0022	-0.00200
17	7	Factor B. Dull vs Bright	0.5413	0.2930	0.0024	0.01406
18	5	Factor F. Sober vs Happy-Go-Lucky	0.5432	0.2951	0.0021	-0.01490
19	20	Self Concept Unintegrated Motivation	0.5456	0.2977	0.0026	-0.01192
20	16	Factor Q4. Relaxed vs Tense	0.5464	0.2986	0.0009	-0.00045

* Significant at the .05 level

** Significant at the .01 level

Factor Q3, Undisciplined vs. Controlled, from the 16 PF contributed an additional 1.24% to the category of success vs. elimination. High scores tend to be associated with eliminees. The strongly controlled, self-respecting, sometimes obstinate nature of individuals scoring high on this trait is probably associated with a willingness to eliminate when problems arise in the course of training. The trait was significant at the .05 level.

The final 1.62% of the variance of this category was predicted by Assertiveness Unintegrated Motivation. High Scores on this measure were associated with success in UNT. The dissatisfication with previous jobs, and the desire for the status associated with a career in the Air Force may be a motivating force toward the successful completion of navigator training. This variable was significant at the .05 level.

The regression composite derived from data of the longitudinal sample (see Table 27) was much smaller in size than the results of the cross-sectional regression. Career Integrated Motivation, predicting 1.28% of the variance, was the major predictor. Again, high scores on this variable were associated with successful students, indicating that interest in technical skills and motivation in keeping a job are important incentives for completing training. This variable was significant at the .05 level.

The Masculinity-Femininity Scale added an additional 1.13% to the predictive power of the equation. High scores (toward the masculine end of the scale) tended to be associated with success. Masculinity as defined by this scale is association with noncultural, more technical activities.

The results obtained from the cross-sectional and longitudinal regression data indicate some important trends of a personal and motivational nature that discriminate between successful and eliminated students in general. From these data, the image of the typical eliminee seems to be an easy-going individual, with awareness of alternative life goals, and a willingness to act on his dissatisfactions. In contrast, the successful students possess a stronger career orientation, an interest in applied technical skills, and a stronger tolerance for various difficulties that occur in the process of training for a career. In general, the successful UNT student appears to have more clearly defined life goals and circumscribed interests, while the eliminee tends to possess a variety of interests, with flexible attitudes toward career plans.

SIE vs. Others. Since SIE was the category of elimination that had the highest representation in both the cross-sectional and longitudinal samples, the regression analyses results for this composite appear

TABLE 27

Summary of Regression Analysis for Longitudinal Sample
Criterion Variables: Eliminees vs Successful
(AFQT Not Forced)

STEP NUMBER		VARIABLE ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	*22	Career Integrated Motivation	0.1133	0.0128	0.0128	0.01527
2	*36	Masculinity - Femininity Scale	0.1554	0.0242	0.0113	0.00128
3	20	Self concept Unintegrated Motivation	0.1815	0.0329	0.0088	-0.01166
4	12	Factor O. Self-Assured vs Apprehensive	0.2037	0.0415	0.0086	-0.01790
5	2	Factor B. Dull vs Bright	0.2185	0.0477	0.0062	0.01041
6	13	Factor Q1. Conservative vs Experimenting	0.2331	0.0543	0.0066	-0.01674
7	6	Factor G. Expedient vs Conscientious	0.2481	0.0616	0.0073	-0.01216
8	11	Factor N. Forthright vs Astute	0.2607	0.0680	0.0063	-0.00837
9	37	Occupational Introversion-Extroversion Scale	0.2708	0.0733	0.0054	0.00192
10	28	Importance - Possibility Scale	0.2820	0.0795	0.0062	0.00750
11	29	Attitude Toward Navigation	0.2901	0.0842	0.0047	-0.04741
12	33	Air Force Officer Scale	0.2976	0.0886	0.0044	0.00248
13	5	Factor F. Sober vs Happy-Go-Lucky	0.3035	0.0921	0.0035	0.01036
14	34	Academic Achievement Scale	0.3090	0.0955	0.0034	0.00155
15	21	Assertiveness Unintegrated Motivation	0.3125	0.0977	0.0022	-0.00706
16	16	Factor Q4. Relaxed vs Tense	0.3156	0.0996	0.0019	-0.00805
17	35	Diversity of Interests Scale	0.3181	0.1012	0.0016	-0.00164
18	3	Factor C. Affected by Feelings vs Emotionally Stable	0.3205	0.1027	0.0015	0.00809
19	7	Factor H. Shy vs Venturesome	0.3230	0.1043	0.0016	-0.01005
20	4	Factor E. Humble vs Assertive	0.3268	0.1068	0.0024	0.00809

* Significant at the .05 level

similar to those of the general success vs eliminee composite. The results of the cross-sectional regression are shown in Table 28. The majority of the variance was predicted by the Attitude Toward Navigation (14.5%). The utility of this instrument for assessing negative attitudes occurring at the time of elimination makes it a strong predictor for this set of criterion variables. This variable was significant at the .01 level.

Factor A - Reserved vs Outgoing (16 PF) was the next trait variable entered into the equation, contributing an additional 2.72% to the amount of predicted variance. Higher scores for this trait were again found to be associated with the eliminees. This finding has special significance for SIEs; more outgoing and self-directed individuals may feel less reserved about voluntarily removing themselves from a situation that brings them various kinds of dissatisfactions. This trait was significant at the .01 level.

The only variable entered into the SIE composite that was not included in the cross-sectional success vs eliminees composite was Factor QII, Low Anxiety vs High Anxiety. This variable predicted an additional 1.3% of the variance, and was significant at the .01 level. Due to the tendency for this factor to be associated with situational anxiety (the inability to meet current demands or achieve desired goals), eliminees tended to score high on this trait. SIEs are possibly those individuals who are quickly subject to anxiety when goal frustrating experiences arise, and are willing to consider alternative solutions to goal satisfaction in order to avoid this anxiety.

The results from the longitudinal sample SIE regression are presented in Table 29. The Diversity of Interests Scale (SVIB) was the major predictor, accounting for 1.83% of the variance. Higher scores on this scale tended to be associated with eliminated students. The point has been made previously that successful students generally tend to have a narrower focus of interests, and results obtained from this scale corroborate this observation. This variable was significant at the .01 level.

Factor O - Self-Assured vs Apprehensive accounted for an additional 2.15% of the variance. Eliminees tended to score higher on this factor, thus showing a tendency toward worrying about present difficulties. This state may influence the individual to eliminate.

Scores from the Trait Anxiety Inventory contributed an additional 1.06% to the prediction of SIEs. Successful students tended to have high scores on this test, showing a higher degree of trait anxiety (rather than the situational anxiety which was characteristic of eliminees). Those individuals who have generalized predispositions toward anxiety

TABLE 28

Summary of Regression Analysis for Cross-Sectional Students
Criterion Variables: SIE vs Others
(AFOQT Not Forced)

STEP NUMBER		VARIABLES ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENT
1	**	29 Attitude Toward Navigation	0.3808	0.1450	0.1450	0.12447
2	**	1 Factor A. Reserved vs Outgoing	0.4150	0.1723	0.0272	-0.02806
3	*	17 Factor Q11. Low Anxiety vs High Anxiety	0.4304	0.1852	0.0130	-0.00532
4		28 Importance - Possibility Scale	0.4434	0.1966	0.0114	0.00530
5		21 Assertiveness Unintegrated Motivation	0.4566	0.2085	0.0118	0.02077
6		23 Fear Integrated Motivation	0.4636	0.2150	0.0065	-0.02041
7		22 Career Integrated Motivation	0.4706	0.2214	0.0065	0.01525
8		6 Factor G. Expedient vs Conscientious	0.7448	0.2283	0.0068	-0.01572
9		27 AFOQT - Officer Composite	0.4844	0.2346	0.0064	0.00103
10		10 Factor M. Practical vs Imaginative	0.4896	0.2397	0.0050	-0.02064
11		14 Factor Q2. Group Dependent vs Self Sufficient	0.4951	0.2452	0.0055	-0.01493
12		35 Diversity of Interests Scale	0.4996	0.2496	0.0044	-0.00375
13		33 Air Force Officer Scale	0.5100	0.2601	0.0105	0.00498
14		18 Career Unintegrated Motivation	0.5152	0.2654	0.0053	-0.01707
15		32 Attitude Toward Military	0.5196	0.2700	0.0046	0.07996
16		15 Factor Q3. Undisciplined vs Controlled	0.5231	0.2736	0.0036	-0.02071
17		2 Factor B. Dull vs Bright	0.5254	0.2761	0.0025	0.01234
18		34 Academic Achievement Scale	0.5275	0.2783	0.0022	0.00182
19		38 Trait Anxiety Inventory	0.5297	0.2805	0.0023	0.05825
20		19 Fear Unintegrated Motivation	0.5315	0.2825	0.0020	0.00881

* Significant at the .05 level
** Significant at the .01 level

TABLE 29

Summary of Regression Analysis for Longitudinal Sample
Criterion Variables: SIE vs Others
(AFOQT Not Forced)

STEP NUMBER	VARIABLE ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	**35 Diversity of Interests	0.1353	0.0183	0.0183	-0.00250
2	**12 Factor O. Self-Assured vs Apprehensive	0.1996	0.0398	0.0215	-0.02244
3	**38 Trait Anxiety Inventory	0.2247	0.0505	0.0106	0.08130
4	**28 Importance Possibility Scale	0.2578	0.0665	0.0160	0.00466
5	3 Factor C. Affected by Feelings vs Emotionally Stable	0.2717	0.0738	0.0074	0.01554
6	33 Air Force Officer Scale	0.2816	0.0793	0.0055	0.00190
7	15 Factor Q3. Undisciplined vs Controlled	0.2910	0.0847	0.0053	-0.00411
8	27 AFOQT - Officer Composite	0.2989	0.0893	0.0047	-0.00058
9	29 Attitude Toward Navigation	0.3045	0.0927	0.0034	-0.02795
10	22 Career Integrated Motivation	0.3100	0.0961	0.0034	0.00659
11	11 Factor N. Forthright vs Astute	0.3156	0.0996	0.0035	-0.00686
12	37 Occupational Introversion-Extroversion Scale	0.3202	0.1025	0.0029	0.00124
13	9 Factor L. Trusting vs Suspicious	0.3237	0.1048	0.0023	-0.00716
14	17 Factor QII. Low Anxiety vs High Anxiety	0.3277	0.1074	0.0026	0.01400
15	18 Career Unintegrated Motivation	0.3316	0.1100	0.0026	-0.00483
16	4 Factor E. Humble vs Assertive	0.3337	0.1113	0.0014	0.00534
17	32 Attitude Toward Military	0.3359	0.1129	0.0015	0.01936
18	8 Factor I. Tough Minded vs Tender Minded	0.3378	0.1141	0.0013	0.00377
19	23 Fear Integrated Motivation	0.3397	0.1154	0.0012	-0.00287
20	21 Assertiveness Unintegrated Motivation	0.3410	0.1163	0.0009	-0.00274

** Significant at the .01 level.

may be unwilling to voluntarily eliminate because of the attention it could draw to themselves. They may choose another route out of the situation, or decide to tolerate present difficulties. This state affective measure was significant at the .01 level.

The Importance-Possibility Scale was the final predictor entered into the SIE composite; it was significant at the .01 level. A high level of motivation toward establishing a career in the Air Force obviously has relevance for distinguishing those individuals who will remain in training. This scale has the same restrictions placed on its interpretation as the other attitude scales used in the analysis, namely that eliminees were given the scales at the point of their elimination, and thus the results are biased in the negative direction.

Both composites indicate that some consistent trends are related to the status of SIE. These individuals appear to be self-directing and conscientious, and tend to have strong reactions to frustrating situations that do not fulfill their needs and standards. Such emotional reactions lead them to readily seek alternative that promise to meet their career-related needs and standards. In contrast, the successful students (and other types of eliminees) appeared to be more tolerant of the difficulties encountered in training, and more adherent to goals that are available in the immediate present.

Academic Eliminees vs. Others. For the cross-sectional sample, none of the variables entered into the final regression analysis using academic elimination as the criterion were significant at the .05 level or better (see Table 30).

The best predictor entered into the longitudinal composite (Table 31) was Factor B - Dull vs. Bright from the 16 PF. High scores for this trait were associated with successful students. The ability to quickly grasp abstract concepts and their interrelationships is a critical skill needed for assimilating material of a technical and scientific nature. This predictor was significant at the .01 level, and predicted 2.04% of the criterion variance.

Factor G. Expedient vs. Conscientious (16 PF) was the next variable entered into the equation. It accounted for 1.36% of the criterion variance, and was significant at the .01 level. High scores on this trait were associated with academic eliminees, and are associated with hard-driving moralistic individuals. These individuals set high standards for themselves, and thus may eliminate when they cannot meet these standards satisfactorily.

TABLE 30

Summary of Regression Analysis for Cross-Sectional Students
Criterion Variables: Academic Eliminees vs Others
(AFOQT Not Forced)

STEP NUMBER	VARIABLE ENTERED		MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	35	Diversity of Interests Scale	0.1154	0.0133	0.0133	-0.00255
2	33	Air Force Officer Scale	0.1734	0.0301	0.0168	0.00181
3	19	Fear Unintegrated Motivation	0.2104	0.0443	0.0142	0.01535
4	2	Factor B. Dull vs Bright	0.2450	0.0600	0.0158	0.00875
5	22	Career Integrated Motivation	0.2612	0.0682	0.0082	0.01372
6	21	Assertiveness Unintegrated Motivation	0.2743	0.0752	0.0070	0.00634
7	27	AFOQT-Officer Composite	0.2848	0.0811	0.0059	0.00047
8	3	Factor C. Affected by Feeling vs Emotionally Stable	0.2950	0.0870	0.0059	0.01121
9	9	Factor L. Practical vs Imaginative	0.3126	0.0977	0.0107	0.01204
10	20	Self Concept Unintegrated Motivation	0.3179	0.1011	0.0034	-0.00877
11	10	Factor M. Practical vs Imaginative	0.3239	0.1049	0.0038	0.00965
12	15	Factor Q3. Undisciplined vs Controlled	0.3280	0.1076	0.0027	0.00465
13	11	Factor N. Forthright vs Astute	0.3321	0.1103	0.0027	-0.00713
14	37	Occupational Introversion-Extroversion Scale	0.3367	0.1130	0.0028	0.00152
15	8	Factor I. Tough Minded vs Tender Minded	0.3412	0.1164	0.0034	0.00650
16	1	Factor A. Reserved vs Outgoing	0.3445	0.1186	0.0022	0.00634
17	14	Factor Q2. Group Dependent vs Self-Sufficient	0.3466	0.1202	0.0015	0.00444
18	6	Factor G. Expedient vs Conscientious	0.3485	0.1214	0.0013	0.00489
19	26	AFOQT-Navigator Composite	0.3503	0.1227	0.0013	0.00038
20	28	Importance-Possibility Scale	0.3516	0.1236	0.0009	-0.00121

TABLE 31

Summary of Regression Analysis for Longitudinal Sample
Criterion Variables: Academic Eliminees vs Others
(AFOQT Not Forced)

STEP NUMBER		VARIABLE ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	**	2 Factor Dull vs Bright	0.1429	0.0204	0.0204	0.01056
2	**	6 Factor G. Expedient vs Conscientious	0.1845	0.0341	0.0136	-0.01379
3	**	13 Factor Q1. Conservative vs Experimenting	0.2277	0.0519	0.0178	-0.01130
4	**	33 Air Force Officer Scale	0.2666	0.0711	0.0192	0.00250
5	*	37 Occupational Introversion-Extroversion Scale	0.2875	0.0827	0.0116	0.00130
6		9 Factor I. Trusting vs Suspicious	0.3012	0.0907	0.0081	0.00768
7		18 Career Integrated Movtivation	0.3147	0.0990	0.0084	0.00665
8		34 Academic Achievement Scale	0.3256	0.1060	0.0070	0.00043
9		11 Factor N. Forthright vs Astute	0.3346	0.1119	0.0059	-0.00486
10		19 Fear Unintegrated Motivation	0.3405	0.1159	0.0040	0.00439
11		27 AFOQT - Officer Composite	0.3445	0.1187	0.0028	0.00043
12		36 Masculinity - Feminity Scale	0.3479	0.1210	0.0023	-0.00130
13		35 Diversity of Interests Scale	0.3528	0.1245	0.0035	-0.00114
14		24 Self Concept Integrated Motivation	0.3566	0.1272	0.0027	-0.00379
15		25 Assertiveness Integrated Motivation	0.3602	0.1298	0.0026	-0.00344
16		1 Factor A. Reserved vs Outgoing	0.3641	0.1326	0.0028	0.00483
17		23 Fear Integrated Motivation	0.3679	0.1353	0.0027	0.00363
18		23 Importance - Possibility Scale	0.3707	0.1374	0.0021	0.00137
19		26 AFOQT - Navigator Composite	0.3729	0.1390	0.0016	-0.00029
20		22 Career Integrated Motivation	0.3755	0.1410	0.0020	0.00314

* Significant at the .05 level.
** Significant at the .01 level.

An additional 1.78% of the variance was accounted for by Factor Q1. Conservative vs. Experimenting (16 PF). This variable, significant at the .01 level, tended to report high scores for eliminees. The skeptical, inquiring nature of high scorers on this test does not mesh with the fast-paced traditional methods associated with UNT. Elimination may then occur over dissatisfactions with the teaching methods employed in training.

The Air Force Officer Scale (SVIB) was also entered into the equation, higher scores were associated with successful completion of UNT. Profiles of interests similar to those of successful individuals from the Air Force are indicative of an easier adjustment to this career field, and hence less difficulty in fitting of oneself into a training program. This variable was significant at the .01 level, and predicted 1.92% of the criterion variance.

The last variable comprising the academic eliminee composite was the Occupational Introversion - Extroversion Scale from the SVIB. High scores for this scale were related to successful status in UNT. High scores are indicative of interest in more scientific and skilled-trade occupations; interests which match the content of the UNT curriculum. The successful students seem to have a propensity for studying trades of this kind, as compared to the eliminees who have more eclectic interests. This variable accounted for 1.16% of the variance and was significant at the .05 level.

In general, the academic eliminee tends toward more concrete thinking, grasps concepts and their interrelationships less quickly, and tends toward slower integration of the material presented in training. Attitudes toward instructional methods tend to be of a skeptical, inquiring nature; simple acquisition of course content and skills does not seem to interest academic eliminees. These attitudes are possibly rooted in wide interests that are less technically and mechanically-oriented. In fact, the interest profiles of academic eliminees tend to be at variance wtih those of successful Air Force officers; this may indicate that academic eliminees are more subject to stress brought about by adjusting to the Air Force and UNT. Adjustmental stress may engender enough anxiety so that academic performance is impaired.

Flying Deficiency Eliminees vs. Others. The regression analysis summary for the cross-sectional sample using flying deficiency elimination as the criterion is shown in Table 32. Three variables were found to be significant at the .05 level or better.

The major amount of variance for the criterion was predicted by the Officer Composite of the AFOQT. This composite, consisting of general measures of quantitative and verbal aptitude, as well as the Officer

TABLE 32

Summary of Regression Analysis for Cross-Sectional Students
Criterion Variables: Flying Deficiency Eliminees vs Others
(AFOQT Not Forced)

STEP NUMBER		VARIABLES ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENT
1	**27	AFOQT-Officer Composite	0.1704	0.0290	0.0290	0.00065
2	**21	Assertiveness Unintegrated Motivation	0.2210	0.0489	0.0198	0.00809
3	* 1	Factor A. Reserved vs Outgoing	0.2556	0.0653	0.0165	-0.00842
4	5	Factor F. Sober vs Happy-Go-Lucky	0.2667	0.0711	0.0058	-0.01188
5	38	Trait Anxiety Inventory	0.2825	0.0798	0.0087	-0.02855
6	32	Attitude Toward Military	0.2929	0.0858	0.0059	-0.03581
7	29	Attitude Toward Navigation	0.3046	0.0928	0.0070	0.02637
8	34	Academic Achievement Scale	0.3145	0.0989	0.0061	-0.00108
9	35	Diversity of Interests Scale	0.3218	0.1036	0.0047	0.00031
10	24	Self Concept Integrated Motivation	0.3266	0.1066	0.0031	0.00496
11	15	Factor Q3. Undisciplined vs Controlled	0.3307	0.1093	0.0027	-0.00385
12	7	Factor H. Shy vs Venturesome	0.3354	0.1125	0.0032	0.00591
13	4	Factor E. Humble vs Assertive	0.3388	0.1148	0.0023	-0.00453
14	2	Factor B. Dull vs Bright	0.3423	0.1171	0.0024	0.00421
15	14	Factor Q2. Group Dependent vs Self-Sufficient	0.3450	0.1191	0.0019	-0.00498
16	33	Air Force Officer Scale	0.3482	0.1212	0.0022	0.00079
17	12	Factor O. Self-Assured vs Apprehensive	0.3506	0.1229	0.0017	-0.00689
18	16	Factor Q4. Relaxed vs Tense	0.3554	0.1263	0.0034	0.00539
19	6	Factor G. Expedient vs Conscientious	0.3573	0.1276	0.0013	-0.00318
20	18	Career Unintegrated Motivation	0.3593	0.1291	0.0014	0.00299

* Significant at the .05 level
** Significant at the .01 level

Biographical Inventory, was obviously not used to its fullest predictive potential as a selection device in this particular sample of eliminees. This variable was significant at the .01 level and contributed 2.90% to the amount of variance predicted.

Assertiveness Unintegrated Motivation (MAT) predicted an additional 1.98% to the variance predicted. High scores on this factor were associated with successful students and other types of eliminees. The tensions concerning status and wealth attainment appear to contribute to the successful completion of UNT. This variable was significant at the .01 level.

Factor A - Reserved vs. Outgoing - from the 16 PF, was the final variable entered into the composite. High scores on this trait were associated with the status of eliminee. The more self-assured, person-oriented nature of individuals scoring high on this trait may predispose them toward elimination.

The Flying Deficiency eliminee seems to possess a deficit of those aptitudes measured by the AFOQT Officer Composite. This lack of skills, combined with a lower aspiration level, and a more outgoing, people-oriented character may predispose these individuals to leave UNT.

The regression analysis for the longitudinal student sample did not yield any significant variables (see Table 33). This lack of significant predictors was probably a result of the extremely low number of Flying Deficiency Eliminees in the longitudinal sample.

Medical - MOA Eliminees vs. Others. Table 34 presents the results of the regression analysis for the cross-sectional sample using Medical and MOA elimination as the criterion. The Trait Anxiety Inventory was the first predictor entered into the regression equation for this group. High scores on this inventory were associated with successful students, showing that a certain level of apprehension motivates the behaviors necessary for the successful completion of UNT. This variable predicted 2.49% of the variance of the criterion variable and was significant at the .01 level.

The Attitude Toward Navigation predicted an additional 1.95% of the variance of the criterion variable. High scores on this scale (favorable attitudes) were again associated with successful students. Since eliminees were tested at the time of their elimination, this variable again became a predictor of elimination. This variable was significant at the .01 level.

TABLE 33

Summary of Regression Analysis for Longitudinal Students
Criterion Variables: Flying Deficiency Eliminees vs Others
(AFOQT Not Forced)

STEP NUMBER		VARIABLE ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	20	Self Concept Unintegrated Motivation	0.0886	0.0079	0.0079	-0.00418
2	12	Factor O. Self-Assured vs Apprehensive	0.1132	0.0128	0.0050	0.00201
3	6	Factor G. Expedient vs Conscientious	0.1370	0.0188	0.0060	0.00684
4	4	Factor E. Humble vs Assertive	0.1541	0.0237	0.0050	0.00698
5	26	AFOQT - Navigator Composite	0.1650	0.0272	0.0035	0.00029
6	38	Trait Anxiety Inventory	0.1736	0.0301	0.0029	0.01960
7	3	Factor C. Affected by Feelings vs Emotionally Stable	0.1906	0.0363	0.0062	0.00804
8	17	Factor QII. Low Anxiety vs High Anxiety	0.1998	0.0399	0.0036	0.00734
9	23	Fear Integrated Motivation	0.2066	0.0427	0.0028	-0.00308
10	24	Self Concept Integrated Motivation	0.2120	0.0450	0.0023	-0.00377
11	10	Factor M. Practical vs Imaginative	0.2168	0.0470	0.0020	0.00290
12	8	Factor I. Touch vs Tender-Minded	0.2206	0.0487	0.0017	-0.00485
13	33	Air Force Officer Scale	0.2248	0.0505	0.0019	-0.00068
14	34	Academic Achievement Scale	0.2305	0.0531	0.0026	0.00060
15	21	Assertiveness Unintegrated Motivation	0.2331	0.0543	0.0012	-0.00225
16	32	Attitude Toward Military	0.2359	0.0556	0.0013	-0.00952
17	19	Fear Unintegrated Motivation	0.2381	0.0567	0.0011	0.00237
18	5	Factor F. Sober vs Happy-Go-Lucky	0.2404	0.0578	0.0011	0.00334
19	7	Factor H. Shy vs Venturesome	0.2448	0.0599	0.0022	-0.00360
20	13	Factor Q1. Conservative vs Experimenting	0.2476	0.0613	0.0013	-0.00222

TABLE 34

Summary of Regression Analysis for Cross-Sectional Students
Criterion Variables: MOA-MED Eliminees vs Others
(AFOQT Not Forced)

STEP NUMBER		VARIABLES ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	**	38 Trait Anxiety Inventory	0.1577	0.2459	0.0249	0.08567
2	**	29 Attitude Toward Navigation	0.2106	0.0444	0.0195	0.07476
3	*	23 Fear Integrated Motivation	0.2439	0.0595	0.0151	0.01308
4	*	8 Factor I. Tough Minded vs Tender Minded	0.2792	0.0780	0.0185	0.02415
5		34 Academic Achievement Scale	0.2948	0.0869	0.0089	-0.00315
6		2 Factor B. Dull vs Bright	0.3111	0.0968	0.0099	0.00315
7		33 Air Force Officer Scale	0.3248	0.1055	0.0087	0.00163
8		1 Factor A. Reserved vs Outgoing	0.3312	0.1097	0.0042	-0.01084
9		26 AFOQT-Navigator Composite	0.3360	0.1129	0.0032	-0.00058
10		7 Factor H. Shy vs Venturesome	0.3408	0.1162	0.0033	0.00711
11		19 Fear Unintegrated Motivation	0.3455	0.1194	0.0032	0.00791
12		12 Factor O. Self-Assured vs Apprehensive	0.3484	0.1214	0.0020	0.01018
13		13 Factor Q1. Conservative vs Experimenting	0.3510	0.1232	0.0018	0.00741
14		9 Factor L. Trusting vs Suspicious	0.3545	0.1257	0.0025	-0.00624
15		14 Factor Q2. Group Dependent vs Self-Sufficient	0.3569	0.1274	0.0017	-0.00467
16		32 Attitude Toward Military	0.3588	0.1287	0.0013	-0.02326
17		20 Self Concept Unintegrated Motivation	0.3613	0.1305	0.0018	0.00533
18		21 Assertiveness Unintegrated Motivation	0.3629	0.1317	0.0012	-0.00423
19		6 Factor G. Expedient vs Conscientious	0.3645	0.1328	0.0011	0.00661
20		15 Factor Q3. Undisciplined vs Controlled	0.3665	0.1343	0.0015	-0.00643

* Significant at the .05 level

** Significant at the .01 level

The third variable entered into the equation was Fear Integrated Motivation from the MAT. This variable contributed an additional 1.51% to the prediction of the criterion variance and was significant at the .05 level. High scores on this trait were associated with successful students and were characterized by needs for safety and strong tendencies toward caution. These needs often lead to an orderly, structured approach to handling situations. For successful students, this approach facilitates successful dealing with the anxieties generated in the course of training. The eliminee, on the other hand, may deal with his apprehensions in a more haphazard and inefficient way, eventually causing him to eliminate.

The last variable included in the composite was Factor I. Tough-Minded vs. Tender-Minded. This trait variable contributed an additional 1.05% to the amount of variance predicted, and was significant at the .05 level. Higher scores, indicative of dependency on others, was associated with successful students. The dependency on the Air Force may lead students to endure the rigors of training in spite of the anxiety aroused in the process.

For the longitudinal sample, the Trait Anxiety Inventory was the first variable entered into the regression composite (see Table 35). High scores were found to be associated with eliminees, showing that the tendency toward anxiety reactions when faced with difficulties is disruptive to performance. This variable contributed 4.35% to the prediction of the criterion variance, and was significant at the .01 level.

Fear Unintegrated Motivation predicted an additional 2.33% of the criterion variance, and was significant at the .01 level. High scores on this test are associated with MOA - Medical eliminees. High scorers tend to be self-deprecating, see the world as threatening, and have frustrated safety needs. The inability to deal in an orderly manner with the fears and other threats to self-esteem that arise in the course of any educational program would naturally lead to eliminations. The MOA - Medical eliminee appears to lack these means for stabilization.

The Masculinity-Feminity Scale (SVIB), significant at the .05 level, contributed 1.73% to the predicted variance. High scores (those toward the masculine end of the scale) tend to be associated with successful students. Eliminees tend once again toward broader, more culturally-oriented interests, while successful students identify with more technical pursuits.

The last variable entered into the composite, the Diversity of Interests Scale, predicted 2.05% of the variance, and was significant at the .05 level. High scores tend to be associated with successful students. This finding is hard to explain, because other measures similar to this

TABLE 35

Summary of Regression Analysis for Longitudinal Students
Criterion Variable: NROTC Electees vs Others
(AFQT Not Forced)

STEP NUMBER		VARIABLE ENTERED	MULTIPLE R	R^2	INCREASE IN R^2	REGRESSION COEFFICIENTS
1	*38	Trait Anxiety Inventory	0.2085	0.0435	0.0435	-0.05236
2	*19	Fear Unintegrated Motivation	0.2585	0.0668	0.0233	-0.00387
3	*36	Masculinity-Feminity Scale	0.2990	0.0841	0.0173	0.00259
4	*35	Diversity of Interests Scale	0.3234	0.1046	0.0205	0.00217
5	24	Self Concept Integrated Motivation	0.3367	0.1131	0.0085	0.00667
6	29	Attitude Toward Military	0.3466	0.1201	0.0070	-0.01156
7	20	Self Concept Unintegrated Motivation *	0.3526	0.1244	0.0042	-0.00503
8	8	Factor I. Tough vs Tender Minded	0.3587	0.1287	0.0043	0.00271
9	9	Factor L. Trusting vs Suspicious	0.3650	0.1332	0.0045	-0.00418
10	22	Career Integrated Motivation	0.3690	0.1362	0.0029	0.00346
11	34	Academic Achievement Scale	0.3722	0.1385	0.0024	0.00078
12	1	Factor A. Reserved vs Outgoing	0.3754	0.1409	0.0024	-0.00195
13	33	Air Force Officer Scale	0.3788	0.1435	0.0026	-0.00093
14	26	AFOQT - Navigator Composite	0.3817	0.1457	0.0022	0.00022
15	11	Factor N. Forthright vs Astute	0.3842	0.1476	0.0019	0.00746
16	14	Factor Q2. Group Dependent vs Self-Sufficient	0.3861	0.1491	0.0015	-0.00221
17	32	Attitude Toward Military	0.3877	0.1503	0.0012	-0.01044
18	21	Assertiveness Unintegrated Motivation	0.3891	0.1514	0.0011	-0.00209
19	12	Factor O. Self-Assured vs Apprehensive	0.3906	0.1525	0.0011	-0.00363
20	3	Factor C. Affected by Feelings vs Emotionally Stable	0.3932	0.1546	0.0021	-0.00328

* Significant at the .01 level

one (Masculinity-Femininity Scale, Occupational Introversion-Extroversion) have repeatedly reported narrowness of interests to be associated with successful students in UNT.

The two composites for the MOA - Medical eliminees indicate some salient trends in the characteristics of these individuals. The most important of these is the method of handling anxiety generated by problems in training. The successful students (and other types of eliminees) are not exempt from problems with anxiety, but they possess well-formed strategies for mitigating stress reactions. The Medical-MOA eliminee, on the other hand, has a great deal of trait anxiety accompanied by uncontrolled fears and needs for safety. These two characteristics aggravate each other, and this process undoubtedly leads to noticeable decrements in performance for these individuals.

Instructor Regression. Results of the regression analysis derived from instructor data are shown in Table 36. There are two variables that significantly predict instructor quality as measured by the Element Leader's Rating of Instructor Effectiveness.

The first variable entered into the equation was the Occupational Introversion-Extroversion scale from the SVIB. This variable predicted 8.37% of the criterion variance and was significant at the .01 level. Low scores (extroverted) were associated with more effective instructors, and indicate an emphasis on working with and helping people. Therefore, an effective instructor appears to possess relational skills as well as the more scientific and technical skills needed for comprehension of UNT material.

Factor N, Forthright vs. Astute, from the 16 PF, predicted an additional 4.21% of the criterion variance. Higher scores on this trait (toward the astute end of the scale) tended to be associated with effective instructors, and indicate individuals who are socially aware, polished and shrewd. This variable was significant at the .05 level.

The successful instructor, then, appears to be both socially aware and astute. He possesses those skills that enable him to work effectively with various UNT personnel as well as those attributes that rate him as a professional. The summary statistics obtained from the scores on the Element Leaders' Ratings of Instructor Effectiveness show that there is a bias toward more positive ratings to be given by the element leaders. Although the possible range for this scale is from eleven to fifty-five points, the actual range extended from 34 to 55 points. Mean score was 48.73 with a standard deviation of 5.42. The spread of scores was fair when the characteristics of the scale are taken into account. A quick examination of the item content for the Element Leaders' Rating of Instructor Effectiveness (see Appendix D) shows this scale to be

TABLE 36

Summary of Regression Analysis for Instructor Test Data

STEP NUMBER	VARIABLE ENTERED	MULTIPLE R	R^2	CUMULATIVE INCREASE IN R^2	REGRESSION COEFFICIENT
1	**Occupational Introversion-Extroversion	0.2893	0.0837	0.0837	-0.16440
2	*Factor N, Forthright vs. Astute	0.3547	0.0421	0.1258	0.66423
3	Fear Integrated Motivation	0.4022	0.0359	0.1617	-0.40918
4	Factor Q1 Conservative vs. Experimenting	0.4299	0.0231	0.1848	-0.65619
5	Masculinity/Femininity Scale	0.4557	0.0228	0.2076	0.15827
6	Tough Minded vs. Tender Minded	0.4849	0.0275	0.2352	0.62137
7	Attitude Toward Navigation	0.5049	0.0197	0.2549	-3.14270
8	Factor A Reserved vs. Outgoing	0.5222	0.0178	0.2727	-0.56792
9	Assertiveness Unintegrated Motivation	0.5345	0.0131	0.2857	-0.39401
10	Job Satisfaction Scale	0.5483	0.0150	0.3007	2.30700
11	Factor O Self-Assured vs. Apprehensiveness	0.5581	0.0108	0.3114	-0.68023
12	Factor H Shy vs. Venturesome	0.5669	0.0100	0.3214	-0.40490
13	Factor G Expedient vs. Conscientious	0.5753	0.0096	0.3310	0.47751
14	Factor Q^2 Group Dependent vs. Self Sufficient	0.5796	0.0049	0.3359	0.21119
15	Self Concept Integrated Motivation	0.5856	0.0070	0.3429	-0.50412
16	Factor C Affected by Feelings/Emotionally stable	0.5904	0.0057	0.3486	-0.30585
17	Self Concept Unintegrated Motivation	0.5924	0.0024	0.3510	-0.15756
18	Fear Unintegrated Motivation	0.5949	0.0029	0.3539	0.21998
19	Assertiveness Integrated Motivation	0.5969	0.0025	0.3563	0.17187
20	Diversity of Interests	0.5984	0.0017	0.3581	-0.03161

* Significant at the .05 level
** Significant at the .01 level

heavily weighted with questions concerning relationships with UNT personnel (Questions 3, 8 and 9) and professional attitudes (Questions 4, 5, 6 and 7). It would then follow that trait variables analogous to these themes would turn out to be significant predictors of effectiveness. A type of rating scale greater in length and with more diversified item content might contribute additional validity to this criterion measure.

3.2.4 Military-Navigator Career Attitude Scales Analyses. Table 37 summarizes the results of the longitudinal sample career attitude testing for successful and eliminated students. Included are the mean attitude score and standard deviation for successful students and eliminees at the beginning of UNT, for successful students at the end of UNT, and for eliminees at the point of elimination. The results of t-tests performed to compare the mean attitude scores of these various groups are also included.

Beginning and End of UNT. The Military-Navigator Career Scales were found to change significantly between the beginning and end of UNT for the successful students. The mean value of the Military Career Scale for the initial administration was 3.701, for final administration 3.504. This difference was significant beyond the .002 level ($t = 15,398$, $df = 333$). The scores on the Navigator Career Scale for successful students also dropped significantly between the beginning and end of UNT. Mean value for initial testing was 3.977, for final testing 3.602. This difference was significant at the .002 level ($t = 3.303$, $df = 333$).

Beginning UNT and Point of Elimination. The Military-Navigator Career Scales were also given to the eliminees at the beginning of UNT and at the point of elimination. The mean value for the Military Career Scale at the beginning of UNT was 3.924, at the point of elimination it dropped to 3.595. This difference was significant at the .002 level ($t = 3.962$, $df = 22$). The Navigator Career Scale also revealed a significant shift for this group. The mean value for the beginning of UNT was 3.712, for end of UNT 3.105; a difference significant at the .002 level ($t = 3.303$, $df = 20$).

Comparison of Successful and Eliminated Students. The mean value for the Military Career Scale for eliminated students at the beginning of UNT was 3.924, for the successful students 3.701. This difference was significant at the .01 level ($t = 2.703$, $df = 355$). At the point of elimination, the eliminees reported a mean value of 3.595 for the Military Career Scale; the successful students at the end of UNT reported a mean of 3.504. The difference between the means was found not to be significant ($t = .7608$, $df = 333$, $p < .50$).

The mean for the Navigator Career Scale for successful students at the beginning of UNT was 3.977, for the eliminees 3.711. This difference was not statistically significant ($t = 1.530$, $df = 333$, $p < .20$). For the point of elimination, eliminees reported a mean of 3.104 on the Navigator Career Scale, while the successful students reported a mean of 3.602 at the end of UNT. This difference was significant at the .002 level ($t = 4.301$, $df = 354$).

TABLE 37

Summary Statistics for Longitudinal Periodic Testing

MILITARY	PHASE	MEAN	STANDARD DEVIATION	SAMPLE SIZE
CAREER SCALE (ATTITUDE TOWARD MILITARY)	Beginning UNT (Successful)	3.701	.3119	334
	End UNT (Successful)	3.504	.3011	334
		(t = 15.398, df = 333, p= .002)		
	Beginning UNT (Eliminees)	3.924	.3878	23
	Point of Elimination (Eliminees)	3.595	.5549	23
		(t = 3.962, df = 22, p= .002)		
	Beginning UNT (Eliminees)	3.924	.3878	23
	Beginning UNT (Successful)	3.701	.3119	334
		(t = 2.703, df = 355, p= .01)		
	Point of Elimination (Eliminees)	3.595	.5549	23
	End of UNT (Successful)	3.504	.3011	334
		(t = .760P, df = 333, p= .50)		
NAVIGATOR CAREER SCALE (ATTITUDE TOWARD NAVIGATION)	Beginning UNT (Successful)	3.977	.4712	334
	End UNT (Successful)	3.602	.5403	334
		(t = 3.303, df = 333, p= .002)		
	Beginning UNT (Eliminees)	3.712	.7683	21
	Point of Elimination (Eliminees)	3.105	.4992	21
		(t = 3.303, df = 20, p= .002)		
	Beginning UNT (Eliminees)	3.711	.7683	21
	Beginning UNT (Successful)	3.977	.4712	334
		(t = 1.530, df = 333, p= .20)		
	Point of Elimination (Eliminees)	3.104	.4992	21
	End UNT (Successful)	3.602	.5403	334
		(t = 4.301, df = 354, p= .002)		

The results of these analyses are subject to many of the interpretive difficulties impinging on the analysis of variance data discussed earlier. In this case, the same attitude scale was administered at two different times, but the greater expanse of time between the two administrations may have mitigated the effects of the nonindependence of treatments. Also, some of the shifts in the attitude scores were again of such a small magnitude that they could not be considered interpretable.

The significant differences obtained for the Military and Navigator career scales between the beginning of and end of UNT for successful students and for beginning of UNT and the point of elimination for eliminees, indicate that realistic attitudes toward both UNT and the military may not have been formed by students at the beginning of training. As training and further experience with the military progressed, more coherent attitudes based upon these experiences were formed. The findings indicate that both eliminated and successful students modified their attitudes toward a less positive direction in the course of UNT.

A notable finding of these analyses was that eliminees held significantly more favorable attitudes toward the military at the beginning of UNT than successful students. This could indicate that successful students had a more realistic appraisal of their situation, and thus were subject to less disappointment as time progressed.

Naturally, the greatest shifts toward negative attitudes directed at both navigation and the military as career fields occurred between beginning of UNT and point of elimination. These negative attitudes were probably caused by intolerance for the difficulties occurring in UNT as well as the frustration of expectations formed early in training.

Item Analysis (Cross-Sectional Sample). Responses of eliminees and successful students on each item of the Importance-Possibility (I-P), Navigation Career, and Military Career Scales were compared through the use of the chi square statistical test. This simple test allows one to determine whether or not the distribution of one group's responses across several categories is significantly different from that of another group. In the analysis of data from the navigation career scale, for example, chi square tests were used to determine whether or not eliminees and successful students differed significantly on the extent to which they agreed or disagreed with each item. This analysis, together with analyses of I-P and military career scale data, will be described in more detail in the following sections.

A point which should be made is that the "successful student" sample in the chi square analyses included neither successful minority students nor successful section leaders. This was necessary since all minority students and half the section leaders (all of whom were successful) were tested, while only a relatively smaller proportion of the remaining successful students from each cross-sectional class were tested. Thus, combining data from these three groups would result in a sample containing disproportionate numbers of minority students and section leaders - a sample which would no longer be representative of the cross-sectional classes.

For each scale that will be discussed below, there is a table (Tables 38, 39, and 40) indicating the percentage of successful students and eliminees that either agreed with, disagreed with, or were undecided about each statement on the scale. Additionally, the computed chi square value is shown along with the probability (p) of attaining such a value by chance alone. In employing the chi square test, the lower the probability of attaining a particular computed value of chi square, the more significant is the difference between the responses by the two groups being compared. For example, the first computed chi square value in Table 39 is 16.46 and a table of chi square values tells us that the probability of attaining this value simply by chance happenings is less than 1 in 1000 ($p < .001$). We may then conclude that the computed value is statistically significant and the two groups (successful students and eliminees) do, in fact, differ in their responses to this item. Statisticians traditionally have not considered any probability above .05 as significant and, hence, the abbreviation N.S. is shown next to any probability value greater than .05.

Military Career Scale. Response percentages for both successful and eliminated students, together with obtained chi squared values and probability values (significance levels) for each of the 21 scale items are presented in Table 38. As a casual examination of this table shows, data from the response classes of "strongly disagree" and "disagree" have been collapsed into a single category, as have data from the "strongly agree" and "agree" classes. This condensation, which was also performed on navigation career scale data, was necessitated by the nature of the chi square test, which is of questionable validity when the number of data points in any single category number less than five. Even after this condensation, in fact, some items failed to yield the required cell frequencies and are so indicated in the Table.

In general, it can be said that eliminees agreed significantly more with the following statements than did successful students.

14. When my present commitment is up, I do not intend to continue in the Air Force.

TABLE 38

Response Percentage , Chi Square and P Values for Military Career Scale Items: Successful Versus Eliminated Students

CAREER SCALE ITEM	PERCENT OF TOTAL RESPONSES: SUCCESSFUL DIS-AGREE	SUCCESSFUL UNDE-CIDED	SUCCESSFUL AGREE	ELIMINEES DIS-AGREE	ELIMINEES UNDE-CIDED	ELIMINEES AGREE	CHI SQUARE	P LESS THAN
1. If I were to go back to civilian life, my attitude toward the Air Force would be favorable.	2.6	4.6	92.8	15.2	11.9	72.9	16.46*	.001
2. Being in the Air Force does not interfere with my plans for the future.	6.5	12.4	81.1	32.2	6.8	61.0	24.92	.001
3. I am satisfied with the Air Force benefits and entitlements, such as leaves, dependency compensation, retirement, and the like.	5.9	9.6	89.5	13.6	3.4	83.0	3.47*	.20 N.S.
4. In general, I think the Air Force is well run.	9.8	20.9	69.3	28.9	22.0	49.1	12.93	.01
5. I think the Air Force is making a good effort in trying to improve its way of doing things.	9.2	12.4	78.4	16.9	23.7	59.3	7.91	.02
6. I feel that in the Air Force I am treated as a human being should be treated.	9.8	18.9	71.2	28.8	6.8	64.4	14.53	.001
7. I feel that the top Air Force officers in Washington take an interest in the welfare of the junior officers.	20.3	32.7	47.1	28.8	32.2	39.0	2.00	.50 N.S.
8. I am not getting along at all in the Air Force.	92.1	6.6	1.3	78.0	8.5	13.6	14.62*	.001
9. On the whole, I have a very good chance of showing what I can do in the Air Force.	3.9	14.4	81.7	32.2	11.9	55.9	32.87	.001
10. In general, I feel that I am getting a square deal from the Air Force.	5.2	5.9	88.9	22.0	13.6	64.4	18.38	.001
11. I think there are good reasons why men have to serve in the armed forces these days.	7.8	9.1	83.0	13.6	13.6	72.9	2.82	.30 N.S.

*Possibly spurious due to small cell frequencies.

TABLE 36 (Continued)

CAREER SCALE ITEM	PERCENT OF TOTAL RESPONSES: SUCCESSFUL DIS-AGREE	SUCCESSFUL UNDE-CIDED	SUCCESSFUL AGREE	ELIMINEES DIS-AGREE	ELIMINEES UNDE-CIDED	ELIMINEES AGREE	CHI SQUARE	P LESS THAN
12. One of the most important factors in preventing an all-out war in the next few years will be a strong Air Force.	5.2	4.6	90.2	10.2	10.2	79.7	4.29*	.20 N.S.
13. I feel that I can get ahead faster in the Air Force than in civilian life.	19.6	30.7	49.7	50.8	18.6	30.5	20.48	.001
14. When my present commitment is up, I do not intend to continue in the Air Force.	57.5	34.6	7.8	28.8	32.2	39.0	32.17	.001
15. I feel that I have a very secure future in the Air Force compared with what it would be in civilian life.	11.8	26.8	61.4	27.1	23.7	49.1	7.52	.05
16. I do not feel that the Air Force is a good place for a married man to raise a family.	56.9	26.1	17.0	39.0	27.1	33.9	8.25	.02
17. In general, I am as happy now as before I joined the Air Force.	10.5	7.8	81.7	32.2	8.5	59.3	15.04	.001
18. In the Air Force there is too much emphasis on details and trivia.	43.1	21.6	35.3	30.5	23.7	45.8	3.02	.30 N.S.
19. I feel that the Air Force does an effective job of utilizing the capabilities of each man.	25.5	31.4	43.1	54.2	18.6	27.1	15.81	.001
20. I do not think that the positive aspects of being in the Air Force outweigh the negative aspects.	77.1	11.1	11.8	54.2	22.0	23.7	10.78	.01
21. I feel that personal appearance regulations (AFR35-10) are arbitrary and have no bearing on my job performance.	30.1	19.6	50.3	23.7	13.6	62.7	2.69	.30 N.S.

16. I do not feel that the Air Force is a good place for a married man to raise a family.

20. I do not think that the positive aspects of being in the Air Force outweigh the negative aspects.

Conversely, eliminees disagreed significantly more often than successful students with the following statements:

2. Being in the Air Force does not interfere with my plans for the future.

4. In general, I think the Air Force is well run.

5. I think the Air Force is making a good effort in trying to improve its way of doing things.

6. I feel that in the Air Force I am treated as a human being should be treated.

9. On the whole, I have a very good chance of showing what I can do in the Air Force.

10. In general, I feel that I am getting a square deal from the Air Force.

13. I feel that I can get ahead faster in the Air Force than in civilian life.

15. I feel that I have a very secure future in the Air Force compared with what it would be in civilian life.

17. In general, I am as happy now as before I joined the Air Force.

19. I feel that the Air Force does an effective job of utilizing the capabilities of each man.

Of the remaining nine statements, six failed to differentiate significantly between eliminees and noneliminees and are so designated by the abbreviation N.S. (not significant) in the "p less than" column of Table 38. The remaining two did show significant differences, but due to small cell frequencies the resulting values of chi square may be spurious.

Navigation Career Scale. Response percentages for both successful and eliminated students, together with obtained chi square values and significance levels for each of the 20 scale items are presented in

Table 39. Here, again, data from the "strongly disagree" and "disagree" categories have been combined, as have data from the "strongly agree" and "agree" categories.

Eliminees, on the whole, tended to agree significantly more with the following statements than successful students:

1. I feel that my strong points could be better utilized in a field other than navigation.

7. My job as a navigator is repetitive and boring in nature.

14. I think that the working hours of a navigator are too long.

Eliminees disagreed with the following statements significantly more often than successful students.

2. My family is in favor of my being a navigator.

3. I was very pleased when I was notified of my assignment to the UNT program.

6. If I were just entering the Air Force, I would choose the same career field that I am in now.

9. Being a navigator will not interfere with my family life.

10. In general, navigation assignments are attractive.

11. The opportunity to fly is one of the things I like most about being a navigator.

12. My job as a navigator will help later in civilian life.

13. I especially like being a navigator because it involves a lot of travelling.

15. I would still want to be a navigator even if I did not receive flight pay.

16. I feel that my future job as a navigator will be satisfying and worthwhile.

20. I feel that being a navigator is a career broadening opportunity.

TABLE 39

Response Percentages, Chi Square and P Values for Navigation Career Scale Items: Successful Versus Eliminated Students

CAREER SCALE ITEM	PERCENT OF TOTAL RESPONSES						CHI SQUARE	P LESS THAN
	SUCCESSFUL			ELIMINEES				
	DIS-AGREE	UNDE-CIDED	AGREE	DIS-AGREE	UNDE-CIDED	AGREE		
1. I feel that my strong points could be better utilized in a field other than navigation.	35.8	31.1	33.1	13.3	8.3	78.3	35.50	.001
2. My family is in favor of my being a navigator.	4.6	19.9	75.5	25.0	36.7	38.3	31.13	.001
3. I was very pleased when I was notified of my assignment to the UNT program.	14.6	13.9	71.5	23.0	25.0	51.7	7.60	.05
4. I feel that a navigator's job is an important position.	4.0	4.6	91.4	10.0	11.7	78.3	6.77*	.05
5. I feel that navigators are held in high esteem in the Air Force.	27.2	24.5	48.3	40.0	18.3	41.7	3.43	.20 N.S.
6. If I were just entering the Air Force, I would choose the same career field that I am in now.	31.8	15.2	53.0	64.4	23.7	11.9	30.07	.001
7. My job as a navigator is repetitive and boring in nature	70.9	19.2	9.9	28.8	23.7	47.5	42.30	.001
8. My opportunities for command positions as a navigator are good.	49.0	21.8	29.1	54.2	23.7	22.0	1.09	.70 N.S.
9. Being a navigator will not interfere with my family life.	35.1	23.2	41.7	61.0	16.9	22.0	12.04	.01
10. In general, navigator assignments are attractive.	15.9	25.8	58.3	39.0	25.4	35.6	14.31	.001

*Possibly spurious due to low cell frequencies

TABLE 39 (Continued)

CAREER SCALE ITEM	PERCENT OF TOTAL RESPONSES						CHI SQUARED	P LESS THAN
	SUCCESSFUL			ELIMINEES				
	DIS-AGREE	UNDE-CIDED	AGREE	DIS-AGREE	UNDE-CIDED	AGREE		
11. The opportunity to fly is one of the things I like most about being a navigator.	2.6	6.6	90.7	13.6	15.2	71.2	14.23	.001
12. My job as a navigator will help later in civilian life.	29.8	35.1	35.1	55.9	28.9	15.2	13.96	.001
13. I especially like being a navigator because it involves a lot of travelling.	6.6	18.5	74.8	16.9	22.0	61.0	6.16	.05
14. I think that the working hours of a navigator are too long.	49.0	35.4	14.6	23.7	50.8	25.4	11.49	.01
15. I would still want to be a navigator even if I did not receive flight pay.	23.2	25.2	51.7	55.9	16.9	27.1	21.01	.001
16. I feel that my future job as a navigator will be satisfying and worthwhile.	6.6	13.9	79.5	55.9	22.0	22.0	74.20	.001
17. I feel that for the most part, navigators are discriminated against.	39.7	32.4	27.8	39.0	27.1	33.9	.93	.70 N.S.
18. As a navigator, my opportunities for promotion are good.	13.2	21.8	64.9	16.9	23.7	59.3	.68	.80 N.S.
19. Staff positions are readily available to navigators.	24.5	35.8	39.7	33.9	25.4	40.7	2.77	.30 N.S.
20. I feel that being a navigator is a career broadening opportunity.	11.3	21.2	67.5	27.1	30.5	42.4	12.78	.01

Differences between eliminees and noneliminees on five of the six remaining items were not significant at the .05 level and are designated as such. The last item did show a significant difference, but low cell frequencies may have resulted in a spurious chi square value, thus casting doubt on the validity of the obtained significance level.

I-P Scale. Response percentages for both successful and eliminated students, together with obtained chi square values and significance levels for each of the 19 scale items are presented in Table 40. Unlike the response categories for the military and navigator career scales, those for the I-P scale items tend to be cognitively dissimilar to an extent that precludes the sort of pooling used to increase cell frequencies on the former two scales. Indeed, only one item (number 12) lent itself to this sort of condensation; the response classes "4 years", "5 years" and "6 years" were combined into a "4-6 years" category. Fortunately, only one item had response classes with frequencies small enough to render the use of the chi square test questionable.

In describing the data in Table 40 we should first point out that the items of the I-P scale primarily taps two types of attitudes. Items 1 through 12 are intended to reveal the relative importance of various factors in a students's decision to become an Air Force officer and thus are concerned with attitudes he held before entering ÖNT. Items 14 through 19 are designed to tap the student's AF career plans at the time the test is administered. Item 13 asks for purely factual information rather than attitudes, and so is in something of a class by itself.

In examining the first group of items, then, it can be seen that eliminees tended to regard the following factors as having significantly less influence on their decision to become an AF officer than did successful students.

2. Wanted an Air Force career.

5. Wanted to fly.

6. Better opportunities in AF than in civilian life.

9. Prestige and status of AF officer appealed to me.

Item 13 did not differentiate successful from eliminated students, but items 14 through 19 did yield highly significicant differences between the two groups.

In general, eliminated students felt less satisifed with their present job, and indicated that they were less likely to make a career of the Air Force, even if offered a regular commission. Eliminated students also felt that the AF officer program had not lived up to their

TABLE 40

Response Percentages, Chi Square and P Values and Degrees of Freedom (df) for I-P Scale Items: Successful Versus Eliminated Students

I-P SCALE ITEM	PERCENT OF TOTAL RESPONSES						CHI SQUARE	P LESS THAN
	SUCCESSFUL			ELIMINEES				
	MAJOR IMPORTANCE	MINOR IMPORTANCE	NO IMPORTANCE	MAJOR IMPORTANCE	MINOR IMPORTANCE	NO IMPORTANCE		
1. Opportunity to continue formal education	56.7	32.0	11.3	53.4	32.8	13.8	.30	.90 N.S.
2. Wanted an Air Force career	59.3	31.3	9.3	41.4	39.6	19.0	6.51	.05
3. Opportunity to meet people	42.7	39.3	18.0	44.8	44.8	10.3	1.90	.50 N.S.
4. Fulfilling your military obligation	29.3	36.0	34.7	32.6	32.6	34.5	.29	.90 N.S.
5. Wanted to fly	90.0	8.0	2.0	56.9	27.6	15.6	20.84	.001
6. Better opportunities in Air Force than in civilian life	49.3	36.0	14.7	41.4	25.9	32.6	8.85	.02
7. Opportunity to travel	79.2	19.5	1.3	64.9	31.6	3.5	4.77*	.10 N.S.
8. No satisfying civilian job available	25.0	37.2	37.8	15.8	35.1	49.1	2.88	.30 N.S.
9. Prestige and status of Air Force officer appealed to me	42.0	45.3	12.7	44.8	29.3	25.9	7.16	.05
10. Bored with civilian life	8.0	40.0	52.0	10.3	32.8	56.9	1.03	.70 N.S.

* Possibly spurious due to low cell frequencies

TABLE 40 (Continued)

I-P SCALE ITEM	PERCENT OF TOTAL RESPONSES								CHI SQUARE	P LESS THAN
	SUCCESSFUL				ELIMINEES					
11. If you had no military obligation, would you still want to be in the Air Force?	NO OBLIGATION	YES	MAYBE	NO	NO OBLIGATION	YES	MAYBE	NO	6.34	.10 N.S.
	13.3	72.0	10.7	4.0	10.5	61.4	15.8	12.3		
12. Would you have applied for a commission if your obligated tour of duty were (Choose one)	4-6 YRS	6 YRS	NONE		4-6 YRS	6 YRS	NONE		3.21	.30 N.S.
	54.8	28.1	17.1		51.7	20.7	27.6			
13. Upon graduation from college, did you hold a full-time civilian job?	YES	NO			YES	NO			.29	.70 N.S.
	37.3	62.7			41.4	58.6				
14. Are you satisfied with your present job?	YES	NO			YES	NO			38.91	.001
	89.3	10.7			49.1	50.9				
15. Do you plan to make a career of the Air Force?	YES	MAYBE	NO		YES	MAYBE	NO		29.48	.001
	53.3	40.0	6.7		31.0	32.6	36.2			
16. If you were offered a regular Air Force commission, would you plan to make a career of the Air Force?	YES	MAYBE	NO		YES	MAYBE	NO		19.15	.001
	66.2	26.3	7.4		41.4	29.3	29.3			
17. Has the Air Force officer program lived up to your expectations?	ALL	MOST	FEW		ALL	MOST	FEW		18.17	.001
	14.7	78.0	7.3		7.9	63.8	29.3			

TABLE 40 (Continued)

I-P SCALE ITEM	PERCENT OF TOTAL RESPONSES						CHI SQUARE	P LESS THAN
	SUCCESSFUL			ELIMINEES				
18. From what you know of the Air Force, do you feel that you will be happy and satisfied in your tour of duty?	YES	PROBABLY	NO	YES	PROBABLY	NO	29.22	.001
	56.0	39.3	4.7	29.8	43.9	26.3		
19. If you were offered a regular commission, would you accept it?	YES	MAYBE	NO	YES	MAYBE	NO	21.21	.001
	82.4	12.2	5.4	53.4	22.4	24.1		

expectations as much as did successful students and did not expect to be as happy and satisfied in their tour of duty. Finally, eliminated students indicated that they would be less likely to accept a regular commission.

Item Analysis - Trends and Discussion. In considering the many significant differences between the responses of successful and eliminated students on the attitude scales examined above, it is important to keep in mind the fact that the comparisons made are between successful students in various phases of instruction and eliminees after they have left UNT. This is especially important in the evaluation of results from the navigator career scale since these items tap the eliminees' feelings about navigation after they have effectively been excluded from that career field. Under these circumstances it is hardly surprising to find that these students have significantly more negative feelings about the navigator career field than their successful counterparts. Indeed, the navigator career scale would be of doubtful validity if it did not differentiate between successful and eliminated students. Fortunately, the present data do provide some support for the use of this scale.

These results, however, cannot address the question of whether or not the eliminees held more negative attitudes towards navigation before their elimination in general and before beginning training in particular. Data relevant to this issue came from eliminees from the longitudinal classes, who received the attitude scales not only at the beginning of UNT (along with all other longitudinal students) but also upon elimination. (See Table 37 and related discussion as well as the following subsection: Item Analysis - Longitudinal Sample Attitude Scales.)

These remarks on the interpretation of navigator career scale data from the cross-sectional classes should also be applied to the interpretation of negative feelings toward the Air Force and toward navigation expressed by eliminees on the military career scale, and on Items 14 through 19 of the I-P scale, since these also tap the student's attitudes at the time of testing. I-P items 1 through 13, however, ask for information on the student's past feelings rather than present attitudes, and so might be less subject to situational influences such as withdrawal from UNT. Thus, we may tentatively conclude from data yielded by these items that eliminated students became Air Force officers for somewhat different reasons than did successful students, or at least that certain factors were more important to the latter group than the former in making this decision.

This difference is especially apparent in the responses to Item 5, "Wanted to fly." Nearly all of the successful students (90%) rated the desire to fly as a factor of major importance in their choice of an

Air Force career and only 2% stated that it was of no importance. Only 56.9% of the eliminees indicated flying as being of major importance. In light of this, it is difficult to avoid the conclusion, however tentative, that one major difference between successful and eliminated students is the apparent lack of interest by the latter group in flying for its own sake. Since this activity is not as important to eliminees, it does not exert the same positive influence on them that it does on successful students. It is possible, then, that some students become eliminees because flying is not a sufficiently strong positive reinforcer for them to overcome the negative aspects of UNT. Successful students, on the other hand, might be willing to exert considerably more effort and overcome more obstacles in order to be able to fly.

In general, then, we may say that students who have eliminated from UNT, in contrast to those still in the program, tend to have more negative attitudes toward the Air Force in general and UNT in particular, at least at the time of their elimination. Eliminees also tend to differ from successful students in the importance they assign to certain factors (especially the desire to fly) in their decision to join the Air Force.

Broad statements such as these are not the only inferences which may be drawn from preliminary analyses of attitude scale data; of course, it is also possible to examine more specific areas of interest. For example, Items 5, 8, and 17 through 19 from the navigator career scale offer a particularly good profile of how students and instructors (a random sample of whom are also receiving the attitude scales) view their status as navigators, while statements 1 and 20 from this scale address the broader question of the subject's perception of the value of navigation as a career. Instructor's responses to these two items were felt to be of particular interest since they have had more extensive experience with navigation as a career, and so should have more accurate and clearly defined concepts of the worth of this career field. Response percentages for these items for eliminees, successful students and instructors are given in Table 41.

Figure 3 presents perhaps the most pertinent aspect of these data, i.e., the percentages of students and instructors who displayed negative perceptions of navigator status and the value of a navigation career by agreeing with Items 1 and 17 and disagreeing with the other five. A casual inspection of this histogram indicates that instructors and eliminated students tend to have somewhat more negative perceptions of navigation than successful students, although the exact nature of this relationship varies from item to item. A closer examination, however, shows that instructors, as a group, tend to be more negative in their overall perception of the status and value of navigation (at least on these key items) than either student group. It is believed that the source of the instructor attitudes is one of AF policy rather than local management.

TABLE 41

Response Percentages for Navigator Status and Value Items From the Navigator Career Scale for Successful Students; Eliminees and Instructors

CAREER SCALE ITEM	PERCENT OF TOTAL RESPONSES								
	SUCCESSFUL			ELIMINEES			INSTRUCTORS		
	DIS-AGREE	UNDE-CIDED	AGREE	DIS-AGREE	UNDE-CIDED	AGREE	DIS-AGREE	UNDE-CIDED	AGREE
1. I feel that my strong points could be better utilized in a field other than navigation.	35.8	31.1	33.1*	13.3	8.3	78.3*	20.9	17.4	61.6*
5. I feel that navigators are held in high esteem in the Air Force.	27.2*	24.5	48.3	40.0*	18.3	41.7	51.2*	17.4	31.4
8. My opportunities for command positions as a navigator are good.	49.0*	21.8	29.1	54.2*	23.7	22.0	80.2*	10.5	9.3
17. I feel that for the most part, navigators are discriminated against.	39.7	32.4	27.8*	39.0	27.1	33.9*	23.3	14.0	62.8*
18. As a navigator, my opportunities for promotion are good.	13.2*	21.8	64.9	16.9*	23.7	59.3	26.7*	26.7	46.5
19. Staff positions are readily available to navigators.	24.5*	35.8	39.7	33.9*	25.4	40.7	59.3*	19.8	20.9
20. I feel that being a navigator is a career broadening opportunity.	11.3*	21.2	67.5	27.1*	30.5	42.4	45.3*	11.6	43.0

* Indicates negative responses toward navigator career field shown in Figure 3.

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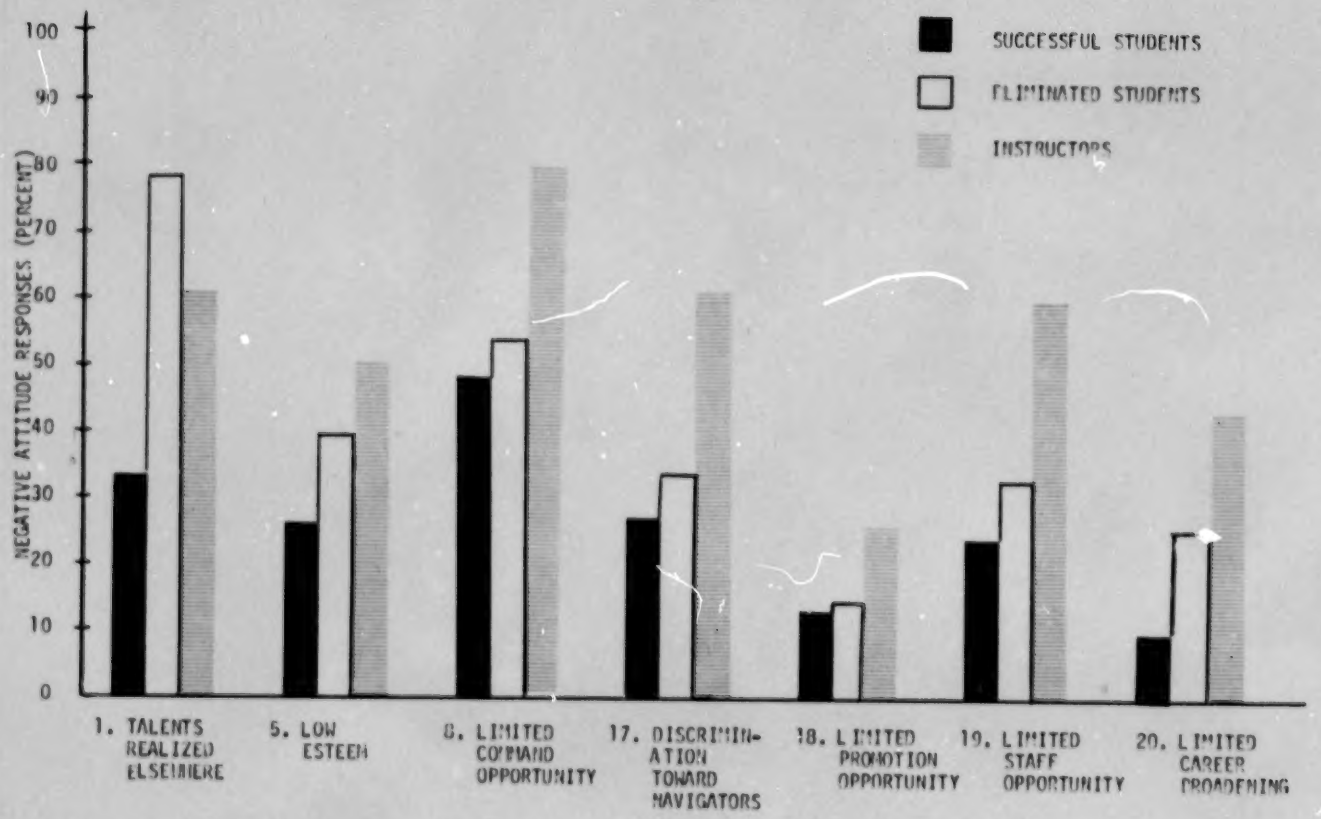

Percent of Successful Students, Eliminees, and Instructors Indicating Negative Perceptions of Navigator Status On Selected Navigator Career Scale Items

FIGURE 3

Assuming, then, that the sample of instructors who received the navigator career scale is representative of the population, we may conclude that many of these officers regard their profession as having "second-class" status in the Air Force and feel that they might be better off in another career field. If this is so, we might reasonably expect that these attitudes would be communicated to the students (if only indirectly) and consequently color their feelings about navigation and UNT. Certainly this would help to explain the subjective impression obtained from interview sessions that students tend to pick up the concept of "second class" navigator status rather early in UNT. It seems a likely possibility that this negativism does have some influence on attrition, though the extent to which it does cannot be answered with the data presently available.

Item Analyses - Longitudinal Sample Attitude Scales. In order to find if eliminees held more negative attitudes toward the military and navigator career fields at the beginning of UNT, item analyses on the Attitude Toward Military, Attitude Toward Navigation and Importance-Possibility scales were performed. Responses of the twenty-five eliminees from the longitudinal sample and a randomly selected sample of twenty-five longitudinal successful students were tallied. The chi-square test could not be validy used to compare the two groups because the expected frequencies for each of the cells were consistently low. The only feasible alternative was the use of the Kolmogorov-Smirnov Two Sample Test, a statistical technique that assesses the degree of agreement between two cumulative distributions. In this case, the number of responses in each of the five response categories (Strongly Disagree, Disagree, Undecided, Agree, Strongly Agree) were tallied per question according to the categories of eliminee or successful student. The Kolmogorov-Smirnov Test was run, and no significant differences were found between successful and eliminee distributions on any of the items.

One of the reasons for these negative results is the characteristics of the statistical techniques used in the analysis. The Kolmogorov-Smirnov Two-Sample Test is conservative at the start (in other words, differences between distributions have to be great before significance can be attained) and the small sample size accentuates this conservatism. Secondly, any attitude scales administered at the beginning of UNT are going to assess sentiments that are relatively unformed and vague. Coherent attitudes are formed after experiences of various kinds in the program.

Another analysis was performed between item responses for eliminees at the beginning of UNT and eliminees at the point of elimination. Responses were tallied but statistical analysis was not possible due to the nature of the obtained data. Lack of a suitable nonparametric test for two related samples (the same individual took the scales twice), and unequal small numbers in each sample made statistical analysis not feasible.

3.3 UNT task data

3.3.1 Description of analyses. It was originally proposed to simply examine the difficulty of navigation tasks within the UNT Program by collecting frequency and time data during flight instruction. This was to include both checkride and practice missions for those phases of instruction which employed airborne navigational systems during training. The suggested measurement technique was to sample the number of repetitions and time required to learn a given skill to a specified proficiency level. This, however, proved to be an unattainable goal in that navigator training is not designed to provide repetition of flight practice missions until the desired proficiency is achieved by each student. Rather, each student performs all missions the same number of times in a group-oriented instructional environment. It, therefore, became necessary to revise the original plan for gathering task data to obtain both a more feasible approach, and more relevant information.

Four basic sources of data were tapped in search of information regarding various tasks in UNT. The first three of these sources were responses to questions presented in the interviews. Specifically these were:

- What is the biggest hurdle(s) in UNT? (asked of successful students, eliminees, and instructors)
- What are the most critical tasks that must be mastered for completion of UNT? (asked of instructors)
- What are the most difficult areas of UNT? (asked of successful students and instructors)

The response to each of these questions were tabulated and the percentage of a group that gave a particular response was computed.

The fourth source of task difficulty data was obtained by asking element leaders to rank order the thirteen academic phases of UNT according to their level of difficulty. Each of the 24 element leaders was instructed to assign a rank of "1" through "13" to the

academic phases; a rank of "1" indicated the easiest phase, while a rank of "13" indicated the most difficult phase. For each phase the median rank assigned by the 24 element leaders was calculated, and on the basis of the magnitude of these median values, each phase was assigned an overall rank (a rank of "1" being assigned to the phase with the lowest median value, "2" to the next lowest, etc.). The median was used as the measure of central tendency for this analysis because it is less influenced by extreme values than the mean.

In addition to the median, a measure of the variability of the ranks assigned to each phase, the semi-interquartile range (Q), was computed. This measure of variability, or dispersion, is defined as half the distance between the 75th and 25th percentile. If the individual ranks are clustered close to the overall rank, Q will be small. If the cases scatter away from the median, Q will be large. In other words, the smaller the value of Q, the greater degree of agreement exists between the ranks.

A final statistic, the coefficient of concordance (W), was calculated for the phase rankings. The coefficient of concordance is essentially a descriptive measure of the agreement among the ranks given by the element leaders. In the case of perfect agreement among ranks, W equals one. In the case of complete disagreement among judges, W equals zero. W does not assume negative values.

3.3.2 Hurdles in UNT. The question "What is the biggest hurdle(s) in UNT?" was asked of students and instructors to assess what tasks, phases or areas in the program were considered to be major stumbling blocks. Table 42 indicates the percentage of each group that cited a particular aspect of UNT as a hurdle.

A large percentage of respondents in both of the student groups and the instructors felt the biggest hurdle to be the Navigation Procedures phase, with 41% of the eliminees, 20% of the successful students and 31% of the instructors indicating such. The AE and Celestial phases were also listed by all three groups as a hurdle, but not to the extent that NP was. Parenthetically, it should be noted that a good many students and instructors that cited either AE or NP also cited the other (in fact many referred to these samples as the "basic phases"). A further point that needs to be made is that most eliminees, not

TABLE 42

Percentage of Eliminees, Successful Students, and Instructors Responding in Each Category to the Following Question: "What is the Biggest Hurdle(s) in the UNT Program?"

RESPONSE	ELIMINEES N = 66	SUCCESSFUL STUDENTS N = 219	INSTRUCTORS N = 106
NP	41	20	31
AF	17	12	8
Celestial	6	12	20
QN	3	2	7
DW	-	22	27
Adjusting to Flying	11	-	5
Academics	12	18	3
Adjusting to Military and UNT	11	3	9
Pressure	5	1	-
Gaining Confidence	3	4	7
Check Flights	8	20	6
Keeping Interest Up	2	1	3
Other	29	17	13
None/All the Same	11	10	1
Don't Know/Not Applicable	15	1	1

having gone through the entire course, were not in a good position to judge hurdles in the UNT program as a whole. This may be a reason why no eliminees cited overwater navigation as a hurdle, while it was the most frequently cited hurdle by successful students and the second most frequently cited hurdle by instructors.

It has been suggested that the Overwater Navigation phase is a hurdle more because of its position in the program than its actual difficulty. Many students pointed out that this was a hurdle because it is the last phase of instruction used as a determinant of final class standing, and that the operational assignments are given upon completion of this phase.

Navigation Procedures also may have been viewed as a hurdle because of its position in the program. Coming at the very beginning of UNT, this phase is closely coupled with the necessary adjustments to both the military and UNT. In fact a number of eliminees, successful students, and instructors actually stated that one of the biggest hurdles in UNT was adjusting to the military in general, and/or UNT specifically. These data would indicate that there may be a need to ease this transition for navigation students. Some consideration should be given to self-paced instruction in the early phases of UNT. This would enable students, particularly those who may be prone toward academic difficulties, to more thoroughly adjust to UNT and also prevent this adjustment process from interfering with their learning the material. The time lost early in the program could be regained later on in the program, after they have adjusted to the UNT environment and regime.

Twelve percent of the eliminees, 18% of the successful students and 3% of the instructors mentioned in rather vague terms that the academics of UNT were a hurdle. Presumably "academics" was defined as formal classroom instruction. One or more check flights were also cited by a sizable number (20%) of successful students (in many cases, all four check flights were mentioned as hurdles). A relatively smaller percentage of eliminees and instructors, however, cited these as hurdles.

3.3.3 Most critical tasks in UNT. Only instructors were asked what tasks they felt were the most critical for successful completion of UNT. Their responses and associated percentages are tabulated in Table 43.

An examination of these data indicates that two phases of instruction, AE and NP, were frequently cited as critical tasks, a finding which supports the subjective impression that many students and instructors regard these first two phases of UNT as "building blocks" which act as a foundation for the rest of the course.

A substantial number of instructors identified "pacing" as a critical navigation task. Pacing has been loosely defined as anything from "keeping up with the aircraft" to "organization." In spite of the fact that it is so widely recognized as an important skill, it is surprising that an investigation of course objectives shows that no attempt has been made to specifically train students in it. Rather, current navigator training philosophy assumes that the ability to "pace" is learned incidentally as a student learns the other more easily defined and discrete tasks of navigation. It is felt that many students do not properly acquire the ability to pace and, in fact, a number of students never even know what it is at the end of UNT. Considering these facts, the possibility of placing more emphasis on pacing and teaching it as a specific skill should be considered.

The rest of the results require little in the way of written comment, although it is of some interest to note that 33% of the instructors polled here often listed such varied critical tasks as "filling out a log," "air savvy," and "using common sense" in addition to the more common responses discussed above. Answers such as these are included in the "other comments" category simply because they are too diverse to be combined into smaller classifications.

TABLE 43

Most Critical Tasks in UNT as Identified by Instructors

Response Category	Percentage Responding N = 106
Navigation Procedures (NP)	33
Pacing	25
Aircraft and Navigation Equipment (AE)	14
Dead Reconing	12
Gaining Confidence	8
Performing Under Pressure	5
Taking ATC Type Exams	4
Other	33

3.3.4 Most difficult areas in UNT. Responses to the question "what areas in UNT are the most difficult for you?" fell into fourteen basic categories. These categories, along with the percentage of successful students whose responses fell into each one, are reported in Table 44 In general, the Celestial phases (taken together) are the most frequently given as the most difficult areas of UNT, followed by Grid Navigation, Navigation Procedures, Aircraft Procedures and Equipment, and Weather, in descending order. This finding roughly corresponds with data previously discussed regarding the phase the student was in when he was eliminated. Specifically, the Celestial phases provided the largest percentage (32%) of eliminees, followed in descending order by Navigation Procedures (16%), Grid Navigation (13%), Radar Navigation (12%), Aircraft Equipment (11%), and Overwater Navigation (10%). The correspondence is not perfect, of course, but in general it can be said that those phases most frequently rated as "most difficult" by successful students also tended to supply the largest proportions of eliminees. In light of this, then, it is not unreasonable to conclude that successful students' perceptions of the difficulty of certain phases of instructions are essentially valid.

Additional data supporting this conclusion can be drawn from instructor interviews and element leaders' rankings of the instructional phases. The data from the former source are also shown in Table 45, next to the student data. One glaring difference between the instructor and student groups is that an overwhelming percentage of instructors (57%) cited Navigation Procedures as being difficult, while only 18% of successful students did so. Another difference exists for the percentage of instructors (32%) and successful students (17%) that listed Aircraft Equipment as a difficult area of UNT. These two phases, Navigation Procedures and Aircraft Equipment, were the first and second most frequent areas cited by instructors as difficult. These were followed by Grid Navigation and then by the two Celestial Phases taken together. What should be noted with regard to the celestial phases is that the students tended to cite both the Day and Night Celestial phases approximately the same number of times. Instructors, on the other hand, tended to cite Day Celestial more frequently than Night Celestial as difficult.

3.3.5 Element leader rankings of phase difficulty. Table 45 indicates the median rank assigned to each of the 13 academic UNT phases by the 24 element leaders along with the semi-interquartile range (Q). The median ranks were used as the basis for the overall ranking of the phases, which are also reported in the table. As mentioned previously, Q is a measure of dispersion of the ranks assigned, or how well the raters agree on the relative difficulty of each phase. Aircraft Procedures and Equipment appears to be the one on which element leaders agree the least, while Aviation Psychology the one on which they agree the most, since they have the highest and lowest Q values, respectively.

TABLE 44

Most Difficult Areas in UNT
As Identified by Successful
Students and Instructors

RESPONSE CATEGORY	RESPONSE PERCENTAGE (%)	
	SUCCESSFUL STUDENTS N = 219	INSTRUCTORS N = 106
Grid Navigation	26	31
Day Celestial	18	23
Night Celestial	18	8
Aircraft Equipment	17	32
Navigation Procedures	18	57
Weather	11	2
Overwater Navigation	10	8
ATC Tests	2	3
Flight Missions	2	2
Check Flights	5	2
Adapting to Military	-	8
Pacing	2	1
Other	10	9
None/All the Same	7	4

TABLE 45

Ranking of UNT Phases According to Difficulty (1 = Easiest, 13 = Most Difficult), Based on Mean Rankings Obtained from 24 Element Leaders

PHASE	RANK	MEDIAN RATING	SEMIINTERQUARTILE RANGE (Q)
Aviation Physiology	1	1.13	.63
Overwater Navigation	2	3.30	2.96
Map Reading	3	3.50	3.33
Flight Publications	4	4.50	4.34
Aircraft Systems	5	5.00	3.75
Weather	6	6.00	5.17
Aircraft Procedures and Equipment	7	6.75	6.00
Radar Navigation	8	6.90	2.85
Night Celestial Navigation	9	9.75	2.33
Low Level Navigation	10	10.00	2.67
Navigation Procedures	11	10.25	3.80
Day Celestial Navigation	12	10.50	3.17
Grid Navigation	13	12.12	2.07

The coefficient of concordance (W) is .62 (maximum value is 1.00) and was found to be significant at the .001 level. This indicates a moderate degree of agreement among the 24 element leaders regarding the relative difficulty of the phases.

The table indicates Grid Navigation, Day Celestial Navigation, and Navigation Procedures to be the most difficult phases as viewed by the element leaders. Aviation Physiology, Overwater Navigation and Map Reading appear to be among the easiest.

It should be noted that although we may safely conclude that the top five phases are generally more difficult than the bottom five, finer differentiations (e.g., "Grid Navigation is harder than Day Celestial Navigation") are inadvisable since the size of the semi-interquartile ranges indicate some disagreement among element leaders.

The phase rankings by element leaders lend further support to the data derived from the interview question dealing with difficult aspects of UNT. In short, the same five areas of UNT - Grid Navigation, Aircraft Procedures and Equipment, Navigation Procedures, and the two Celestial phases - invariably are regarded as among the most difficult aspects of the course by both students and instructors.

This finding naturally raises the question of why these particular phases should be so difficult. The answer, of course, varies from phase to phase. Grid Navigation appears to present problems because, according to those students and instructors who rated it as "most difficult," it is quite different from the other phases of navigational instruction and is used so little in the "real world," while the Celestial phases are regarded as involving a good deal of difficult theory. AE and NP, on the other hand, are often cited as being difficult largely because they are the first navigation phases of the program and are taught at a brisk pace. The student is required to learn these very basic and essential aspects of navigation while simultaneously undergoing the necessary physical and psychological adaptation to UNT. Thus, the phases are apparently quite difficult to learn, even though the material itself may not seem quite so formidable when examined out of this context. Apparently, in UNT, as in other instructional programs, the difficulty of a particular block of material is not always a direct function of its complexity. The fact that a significant number of students resent having to learn Grid Navigation because it is used so little in the "real world" indicates a need to convey to both students and instructors alike its importance for worldwide navigation. Since it is difficult for students to actually know what goes on in the real world of navigation, it appears that they obtain their attitudes regarding Grid Navigation from instructors and, hence, the need exists to educate the instructors themselves on its role in global navigation.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Overview. The purpose of the following section is to integrate the findings that have already been presented in earlier sections and to make recommendations based on these findings. The recommendations are organized and presented in three subsections. The first subsection contains recommendations that have impact on present selection procedures, i.e., ways in which these procedures might be improved to reduce future UNT attrition. The second contains recommendations regarding course development and modifications. The third subsection presents recommendations concerning factors that are external to the UNT program. That is, factors having impact on attrition in UNT, but over which training managers have little control. Rather, they stem from policies and events that occur at levels within the AF and are therefore not amenable to immediate change by UNT training managers.

4.2 Recommendations (Selection Procedures). Recommendations for selection procedures were derived from the profiles of different types of eliminees presented earlier. The profiles consisted of characteristics of a personal, motivational, interest, attitudinal and affective nature that are unique to eliminated students. An integration of the essential themes of these profiles will provide the basis for the criteria suggested for future UNT selection. Separate recommendations will be made according to each category of elimination.

Eliminees vs Successful. An assessment of the amount of motivation that an individual has toward establishing a navigator career seems to be of importance. A distinguishing feature of the successful student seems to be his focus on the acquisition of technical skills that will allow him to practice navigation as a career, and factors such as past technical experience, the quality of prior performance, and the individual's striving for jobs of a higher status are indicators of this work orientation. The most relevant and attainable measures of career motivation for UNT students are the type and quality of undergraduate education, and the individual's expressed interest in the responsibilities and tasks that comprise a navigator career. Therefore, note should be taken of the student's college major, the number of hours he has in math and science courses, and the grades obtained in these courses. This information should be supplemented by administration of an interests measure such as the Strong Vocational Interest Blank. Through a combination of measures of stated interest in technical pursuits and the ability to successfully grasp material of a technical nature, attrition may be alleviated. In short, there should be an orientation toward using various indicators that show career orientation, focused technical interests, and acceptability of the work entailed in the career of a navigator.

SIE vs Others. Recommendations for reducing self-initiated eliminations follow many of the same themes presented in the suggestions for reducing attrition generally. Again, it is important to assess the strength of the individual's career motivation, the nature of the individual's interests, and how realistically UNT would fulfill these interests and motivations.

However, the characteristic feature of SIEs are several interrelated personality traits that predispose them to frustration when goals are not immediately obtained. The 16 PF (or some comparable personality inventory) should be administered and special attention should be paid to scores on measures of conscientiousness, apprehension and tendency toward situational anxiety. Individuals reporting high scores on these traits could either be placed in another type of training program, or help should be made readily available to these students so that they will not become so easily discouraged early in training. In general, supportive types of measures should be employed for those students identified as having these character traits in order to ensure their retention in the UNT program.

Academic Eliminees. The academic eliminee appears to lack the ability to quickly integrate the material presented in the course of training, and is less tolerant of teaching methods that emphasize the assimilation of large amounts of information. An assessment of the individual's ability to perform well in academic achievement situations is clearly needed in order to identify potential academic eliminees. An examination of records of past academic performance, as well as measures of current ability and achievement-orientation (the AFOQT, the Academic Achievement Scale on the SVIB) may help to alleviate this source of attrition.

Flying Deficiency Eliminees. This type of eliminee also seems to lack those basic skills that are needed for success in both the academic and performance aspects of UNT. This type of eliminee appears to have a deficit in the ability to "pace," a cognitive skill characterized by the ability to organize and integrate a variety of subtasks in order to successfully accomplish a navigational mission. An instrument designed to test the level of this skill, combined with information obtained from the AFOQT, may aid in the early identification of these eliminees.

MOA and Medical Eliminees. The main course of action indicated for reducing the number of MOA-Medical eliminees is finding some way of distinguishing individuals with consistently high levels of anxiety. Identification of these students can be accomplished through the administration of an instrument designed to measure manifest anxiety (such as the Trait Anxiety Inventory). High scorers may then be

informed about sources of counseling that will help them complete training.

Instructor Selection. The results of the instructor regression analysis indicate that two factors relate to effectiveness as perceived by their element leaders: occupational extroversion and social astuteness. The combination of technical knowledge, interpersonal effectiveness, and professional integrity implied by these two factors is difficult to assess. Several measures may be taken in order to form a profile of a good instructor.

A measure of vocational interests (such as the Strong Vocational Interest Blank) may be helpful in identifying those individuals with interest patterns centered around technical knowledge and more person-oriented occupations such as teaching.

4.3 Recommendations (Course Development and Modification).

Scheduling. The scheduling of classes and flight missions appeared to be a major source of irritation for both instructors and students at the time the study was conducted. The mentioned dislikes of the present scheduling system, such as flights and classes at varying and often unpleasant times (e.g., Friday evenings), placement of check rides the day before an academic test, the heavier than usual workload at the beginning of the course, and the occasional 3-4 hour breaks between classes, certainly did not endear navigation as a career to even those enthusiastic about it. Not only did a large percentage of students and instructors express complaints, but many also made a specific recommendation that they be worked out. There is some evidence that some of the scheduling problems have been worked out within recent months, but many still remain. The obvious recommendation, then, is to improve those remaining problems. This could be accomplished by having systems analysts, working in conjunction with those responsible for scheduling, apply computerized resource allocation models to the present system.

These models would take into account such factors as content sequence, student loads, equipment loads, student flow and other logistical considerations. It is anticipated that if scheduling is improved, the performance and morale of both students and instructors would improve. Barring improvements, an explanation of the unavoidability of scheduling inconveniences is in order.

Flight Delays. Another source of irritation that relates to the previous problem of scheduling, though in an indirect manner, is that of flight delays. Students disliked having to wait around, sometimes for hours, for a flight to take off either because of bad weather or

maintenance that was being done on the aircraft. Often after waiting a long time the flight was aborted anyway. Some of the delays due to maintenance may be avoided in the future by replacement of the T-29 aircraft with the T-43, but this will not alleviate the problem with regard to weather. Though it might create some additional scheduling problems, it would be beneficial from the standpoint of student morale to make them aware of the present UNT policy that states a flight will be cancelled after three hours have elapsed. This would relieve some of the uncertainty of the situation and perhaps make the experience more bearable.

Physical Training. Physical Training (PT) was found to be objectionable primarily because of its scheduling. A student might be scheduled for PT three times in one week and then not have it again for two weeks. There is little gained by PT scheduled in such a manner. If PT is to be programmed into UNT, there should be more regularity to it, particularly if the intent is to physically condition the students.

Individualized Instruction. The present investigation provided support for the recommendation that some type of self-paced program be incorporated into navigator training. The most frequent aired eliminee complaint about UNT was that there was not enough time to learn the material. This problem was particularly acute during the early phases of the program. Additionally, major importance was placed on these early phases by both students and instructors. They were often referred to as the basic phases in that they formed the foundation of everything that was to follow. These basic phases were often identified as being the most difficult and also as being a major hurdle in UNT. When students and instructors were asked for suggestions that they would make to new students, they frequently stated they would tell them to "get the basic down cold." The evidence for self-pacing in part or all of the UNT program therefore exists. More emphasis should be placed on whether the students are learning, rather than whether they are all getting the exact same information in exactly the same way. Letting the student progress at his own rate of course would be the ideal. However, if self-pacing is not feasible, training managers might try grouping students with similar abilities, and either lengthening or shortening the course to meet the students' ability levels. In other words, be more flexible with how the course can be taught.

Students could be grouped along those lines suggested in the sections of this report dealing with selection procedures. Specifically, such measures as the AFOQT and the 16 PF in conjunction with educational background (e.g., technical vs nontechnical), could form the basis of placement of students into the various tracks. It is suggested that

more research be conducted in this area in order to establish optimal methods for such placement.

Student Pacing Skills. A substantial number of instructors identified "pacing" as a critical navigation task. Pacing has been loosely defined as anything from "keeping up with the aircraft" to "organization." In spite of the fact that it is so widely recognized as an important skill, it is surprising that an investigation of course objectives show that it has not been adequately defined and that no attempt has been made to specifically train students in it. Rather, current navigator training philosophy assumes that the ability to "pace" is learned incidentally as a student learns the other more easily defined and discrete tasks of navigation. It is felt that many students do not properly acquire the ability to pace and, in fact, a number of students never even know what it is at the end of UNT. It seems that this is a cognitive skill that could be tested prior to UNT selection. If it is skill, it could be developed via some kind of cognitive pretraining program, either remedial or formative. It feasibly could be developed as a subcourse within one of the presently established phases (e.g., Navigation Procedures), or as a part of all flight planning sessions. It has been pointed out that in the recently installed all-jet UNT program, there will be approximately three hours of flight planning and discussion of mission requirements and route analysis associated with simulator "flights." However, it is still felt that an even more conscious effort is needed.

If pacing is a skill, there would be differing ability levels of incoming students that could be tested. With the development of a valid screening device it could be determined which students are predisposed to learning difficulties in the area of pacing. This type of student should not be in the program or may need special help. Therefore, an investigation into the development of a pacing selection device is recommended.

Standardization. During the course of many interviews, statements relating to standardization of both instructor performance and grading procedures frequently appeared. Students and instructors alike cited inconsistent instructor grading and navigation methods as displeasing aspects of UNT. Among the suggested changes were "improve and standardize instructor performance" as well as "standardize grading of check rides." Lack of standardization in these areas were caused by a number of factors. Many instructors appear to have a variety of preferred navigation techniques. As an example, an instructor on a practice flight might teach the student to use some of the subtle techniques he prefers to use when navigating, and then the student might be graded down on a check flight if he uses them.

Weather conditions are also a contributing factor. A student on the day of a check flight might have bad weather and have to fly an alternate route. one he was not as familiar with. Other students who flew the mission at another time had the advantage of flying the original, more familiar route. The instructors provided even more variance in that some instructors tend to be "easier" or "harder" in grading students. Given all these factors, a recommendation is made to standardize both instructor performance and grading. Standardization could be achieved by having check "flights" run in a simulator where conditions can be held constant for all students. When it is necessary to have instructors grade students, standardization can be achieved through the application of principles of Instruction System Development (ISD). This result would be realized because ISD is based on behavioral objectives, that is, based on what the man needs to do. The standards of performance are therefore less capricious.

Academic Tests. Standardizing of instructional methods and grading procedures brings us to another problem area, that of academic tests. Despite continuous monitoring of the written tests, the typical "ATC type" test (multiple choice) was viewed in a negative way by many. Specifically, students felt that the tests did not measure their navigation knowledge but rather their ability to read the question or memorize the text. Additionally, they objected to the use of ambiguous questions on the tests. In fact, a number of students and instructors suggested that inability to take ATC tests was a reason for some academic eliminations. A reevaluation of these tests seems in order. In fact, given that both flight checks and academic tests are sources of irritation, the entire evaluation process might be reviewed and made more job relevant. It is necessary to mention that this can be accomplished through the application of ISD principles and the problem may have already been somewhat alleviated. However, there remains a need for the test questions to be written by professional test writers. This is so because no matter how job relevant a question may seem, it still may be ambiguous in nature. Additionally, it is felt that it would be extremely useful to provide counseling in test taking techniques for students who need it.

Help, Advice and Counseling. A relatively large number of instructors cited the class advisor as being a source of help or advice. However, only a very small number of students actually utilized this source. The class advisor is a line instructor who is assigned to a particular UNT class, ostensibly to serve as a nonauthoritarian confidant to the students. He should be someone they can talk freely and frankly with, or seek help and advice from without fear of any repercussions. This would seem to be an important service and one that students would take advantage of. Yet, only 1% of the eliminees and successful students that sought help stated that they did so from the class advisor. A

recommendation is therefore made that the role of class advisor be clearly defined for both the advisors and the students. Also, the class advisor may need to make himself more visible, assure his students that they can confide in him, and make it known that he is simply there to be of help.

The learning center was also cited as a source of help for students by the instructors yet was not used by students for extra help. Considering the expense of developing, operating and maintaining the learning center, it seems wasteful that only 1% of the eliminees and none of the successful students that sought help or advice utilized it. A small-scale investigation into the reasons why is recommended. From this investigation one can determine the specific complaints students have about the learning center, and specific suggestions they may have for improving it. It is also possible that it is not publicized enough, that students are not even aware that it can help prepare them academically and provide remedial help. If this is the case, the recommendation is to make this more obvious to the students.

Influence of Element Leaders and Section Leaders. Based on data that indicates over 50% of both the eliminees and successful students perceived their element leaders as either having no influence or a negative influence, a recommendation is made to further investigate and correct this state of affairs. The underlying assumption in this recommendation is, of course, that one of the responsibilities of an element leader is to influence and enrich a future navigator's experience at UNT.

The data also indicated that a large percentage of students did not view the section leader as having exerted much influence on their training. It was the impression of the investigators that the section leaders that did exert a positive influence were those that had been nonrated officers prior to UNT. This was so because they were usually more able to provide accurate information of what Air Force life would be like after completion of UNT, and to explain the pros and cons of various operational commands and assignments. Since quite a few nonrated officers enter the program anyway, it is recommended that an effort be made to insure that a certain number of prior service officers be entered with each UNT class.

Suggestion Program. Students and instructors alike gave a large and varied number of changes regarding specific phases that they would like to see implemented. The suggested changes, for the most part, were sensible and constructive. It is recommended that a panel be permanently established to listen to and consider suggestions regarding the course from both students and instructors. At present students have an opportunity to make suggestions via Student Suggestions for Improvements (SSFI) forms, and instructors have the same opportunity via "Form 6."

However, it appears that they are not utilized to the fullest extent. It is recommended that the suggestion program be improved by providing for the following: (1) rapid feedback regarding the disposition of suggestions, (2) timely implementation of approved suggestions, and (3) increased recognition of outstanding suggestions.

Discrimination. Discrimination as we traditionally know it did not seem to be a major problem in UNT. However, since it was discovered that "reverse discrimination" was perceived by many students and instructors, it is recommended that training managers be constantly aware of the impact on the morale of nonminority students if unfair allowances are made to minority students. Reverse discrimination, it seems, can be just as damaging and unjust to all involved as discrimination as we traditionally know it.

4.4 Recommendations (AF policies).

Briefing and Orientation. Since a large number of students stated that they did not know what UNT or navigation was all about, the obvious recommendation is to provide students with a more thorough UNT/navigation briefing, preferably prior to their becoming committed to the navigation career field. Additional support for this recommendation comes from the data regarding suggestions the present UNT students would make to new students. Specifically, these were to "be sure you want the navigator career field" and "be prepared for UNT (know what you are getting into)."

The recommended briefing should include combinations of course outlines, films, question and answer sessions conducted by Instructor Navigators (INs) and perhaps even flights in the T-43. Barring flights, at least a static display of the aircraft is recommended. The orientation should provide a realistic picture of UNT and the navigator career field. Information concerning the type and amount of work involved and career opportunities and limitations is important to a young man selecting his career. Disillusionment is the result of emphasizing the good location of Mather AFB and allowing the impression to persist that one can complete UNT with little or no effort. Included in this recommendation is the assumption that having been exposed to a "warts and all" portrayal of UNT and navigation, the prospective student navigator would then have a choice as to whether or not he would proceed to UNT. It would do little good to provide clear information and then deny the student an opportunity to act based on that information.

Evidence for a realistic orientation is provided by Lohmann (1974) who found that a realistic perception of role requirements is positively related to the variables; performance, the will to learn, and propensity to leave undergraduate pilot training.

A study by Ilgen and Seely (1974) provides further evidence that such a briefing could serve to reduce voluntary attrition from UNT. In this study, U.S. Military Academy cadets were provided with realistic information after they decided to join the organization, but before they actually reported. The rate of voluntary resignations for the group that received the information was significantly lower than that of a comparable group of cadets who did not receive the information.

Professional Discrimination. The findings indicate that at the time the study was conducted, both students and instructors believed that navigators were discriminated against. They felt that navigators, when compared with pilots, had limited promotion, command and career broadening opportunities. Eliminating this form of discrimination would have a dramatic and favorable impact on the attitudes and motivation of both student and instructor navigators. It would also have the effect of eliminating or reducing the alienation and disaffection that results from discrimination.

Section 8577, Title 10, United States Code, a regulation which prohibited navigators from commanding flying units appeared to be at the root of the problem. This regulation has since been repealed. However, it is not enough to simply make it possible for a navigator to assume command, it must also be probable.

Jefferies (1974) cites examples of actions that could be taken. The first is to identify staff positions that navigators can fill in preparation for command, and reserve a percentage for them. Secondly, identify selected flying units that could be commanded by navigators. Third, navigators with broad flying experience who have demonstrated command ability in "additional duties" or in the rated supplement should be identified and appointed on a planned progressive basis to command the selected flying units. Finally, any rated distinction between navigators and pilots should be removed from promotion folders, allowing only experience and performance to reflect on an officer's qualifications.

Recruiting Policy. Officer recruiting policy of the recent past and the present appears to have had an effect on the attrition rate of UNT. Many SIEs stated they never really wanted to be a navigator in the first place. However, the policy at the time required that they commit themselves to a flying training program. A recommendation to modify this policy is therefore made. It is believed that if individuals are not forced to attend UNT as a condition for acceptance to Officer Training School, the number of students who voluntarily eliminate from UNT will be dramatically decreased.

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APPENDIX A: ATTITUDE SCALES

ATTITUDE TOWARD MILITARY SCALE

NAME _____ DATE _____

SSAN _____

DIRECTIONS: Below are several statements which students have used to describe how they felt about a military career. Read each statement carefully and then circle the number which indicates how you feel about being in the Air Force.

There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which best describes how you feel.

	STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
1. If I were to go back to civilian life, my attitude toward the Air Force would be favorable.	1	2	3	4	5
2. Being in the Air Force does not interfere with my plans for the future.	1	2	3	4	5
3. I am satisfied with the Air Force benefits and entitlements, such as, leaves, dependency compensation, retirement, and the like.	1	2	3	4	5
4. In general, I think the Air Force is well run.	1	2	3	4	5
5. I think the Air Force is making a good effort in trying to improve its way of doing things.	1	2	3	4	5
6. I feel that in the Air Force I am treated as a human being should be treated.	1	2	3	4	5
7. I feel that the top Air Force officers in Washington take an interest in the welfare of the junior officers.	1	2	3	4	5
8. I am not getting along at all in the Air Force.	1	2	3	4	5
9. On the whole, I have a very good chance of showing what I can do in the Air Force.	1	2	3	4	5
10. In general, I feel that I am getting a square deal from the Air Force.	1	2	3	4	5
11. I think there are good reasons why men have to serve in the armed forces these days.	1	2	3	4	5
12. One of the most important factors in preventing an all-out war in the next few years will be a strong Air Force.	1	2	3	4	5

		STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
13.	I feel that I can get ahead faster in the Air Force than in civilian life.	1	2	3	4	5
14.	When my present commitment is up, I do not intend to continue in the Air Force.	1	2	3	4	5
15.	I feel that I have a very secure future in the Air Force compared with what it would be in civilian life.	1	2	3	4	5
16.	I do not feel that the Air Force is a good place for a married man to raise a family.	1	2	3	4	5
17.	In general, I am as happy now as before I joined the Air Force.	1	2	3	4	5
18.	In the Air Force there is too much emphasis on details and trivia.	1	2	3	4	5
19.	I feel that the Air Force does an effective job of utilizing the capabilities of each man.	1	2	3	4	5
20.	I do not think that the positive aspects of being in the Air Force outweigh the negative aspects.	1	2	3	4	5
21.	I feel that personal appearance regulations (AFR35-10) are arbitrary and have no bearing on my job performance.	1	2	3	4	5

ATTITUDE TOWARD NAVIGATION SCALE

NAME _____ DATE _____

SSAN _____

DIRECTIONS: Below are several statements which navigators have used to describe how they felt about navigation as a career. Read each statement carefully and then circle the number which indicates how you feel.

There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which best describes how you feel.

	STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
1. I feel that my strong points could be better utilized in a field other than navigation.	1	2	3	4	5
2. My family is in favor of my being a navigator.	1	2	3	4	5
3. I was very pleased when I was notified of my assignment to the UNT program.	1	2	3	4	5
4. I feel that a navigator's job is an important position.	1	2	3	4	5
5. I feel that navigators are held in high esteem in the Air Force.	1	2	3	4	5
6. If I were just entering the Air Force, I would choose the same career field that I am in now.	1	2	3	4	5
7. My job as a navigator is repetitive and boring in nature.	1	2	3	4	5
8. My opportunities for command positions as a navigator are good.	1	2	3	4	5
9. Being a navigator will not interfere with my family life.	1	2	3	4	5
10. In general, navigator assignments are attractive.	1	2	3	4	5
11. The opportunity to fly is one of the things I like most about being a navigator.	1	2	3	4	5

		STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
12.	My job as a navigator will help later in civilian life.	1	2	3	4	5
13.	I especially like being a navigator because it involves a lot of travelling.	1	2	3	4	5
14.	I think that the working hours of a navigator are too long.	1	2	3	4	5
15.	I would still want to be a navigator even if I did not receive flight pay.	1	2	3	4	5
16.	I feel that my future job as a navigator will be satisfying and worthwhile.	1	2	3	4	5
17.	I feel that for the most part, navigators are discriminated against.	1	2	3	4	5
18.	As a navigator, my opportunities for promotion are good.	1	2	3	4	5
19.	Staff positions are readily available to navigators.	1	2	3	4	5
20.	I feel that being a navigator is a career broadening opportunity.	1	2	3	4	5

JOB SATISFACTION SCALE (INSTRUCTORS)

The following questions refer to your job as an instructor. Read each item carefully and circle the number which indicates how you feel about being an instructor.

		STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
21.	I think there is enough variety in instructor duty to keep the job from becoming routine.	1	2	3	4	5
22.	My job as an instructor is very interesting.	1	2	3	4	5
23.	I wish I had had more field experience before becoming an instructor.	1	2	3	4	5
24.	I consider myself an effective instructor.	1	2	3	4	5
25.	I think that the student load is too heavy for me to do a really good job of instructing.	1	2	3	4	5
26.	I like the geographical location of Mather.	1	2	3	4	5
27.	I find that working with students is challenging.	1	2	3	4	5
28.	At this point in time, my present job suits me better than any other job I know of in the Air Force.	1	2	3	4	5
29.	I think my strong points could be better utilized in a different assignment.	1	2	3	4	5
30.	I do not feel that I am really part of the unit I work with.	1	2	3	4	5
31.	I think that all other things being equal, the man who has been a technical training instructor has a little better chance for advancement than the one who has not.	1	2	3	4	5
32.	I was pleased when I was notified of my assignment as an instructor.	1	2	3	4	5
33.	I think the positive aspects of my assignment to Mather out weigh the negative aspects.	1	2	3	4	5

		STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
34.	Almost all of the things that I do as an instructor seem to me to be important.	1	2	3.	4	5
35.	Sometimes the pressure of my job is more than I can bear.	1	2	3	4	5
36.	I do not think that I receive adequate recognition for my performance as an instructor.	1	2	3	4	5
37.	I find the subject matter of my course interesting.	1	2	3	4	5
38.	All things considered, I get enough personal job satisfaction from this assignment.	1	2	3	4	5

ATTITUDE TOWARD INSTRUCTION SCALE

NAME _____ DATE _____

SSAN _____

DIRECTIONS: Below are several statements which students have used to describe how they felt about the instruction they have just completed. Read each statement carefully and then circle the number which indicates how you felt while you were learning the UNT course materials you have just completed.

There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which best describes how you felt.

	STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
1. The presentations repeated what I was assigned to read.	1	2	3	4	5
2. When concepts and procedures were presented, they were easy to understand.	1	2	3	4	5
3. The test questions I had to answer were clearly stated.	1	2	3	4	5
4. I felt that the instruction moved too quickly.	1	2	3	4	5
5. There was sufficient time for me to study the materials on my own.	1	2	3	4	5
6. The films and slides motivated me to learn the materials.	1	2	3	4	5
7. I felt that I was not given enough individual personal attention.	1	2	3	4	5
8. I was not sure how much I was learning during the instruction.	1	2	3	4	5
9. The method of instruction made learning too mechanical.	1	2	3	4	5
10. I felt that I wanted to do my best work during the instruction.	1	2	3	4	5
11. Answers were given to the questions I had about the material.	1	2	3	4	5
12. The class material was well organized and clearly stated.	1	2	3	4	5

		STRONGLY DISAGREE	DISAGREE	UNDECIDED	AGREE	STRONGLY AGREE
13.	I did not have enough time to finish the written tests.	1	2	3	4	5
14.	My scores on the written tests reflected my proficiency as a navigator.	1	2	3	4	5
15.	My scores on the check flights reflected my proficiency as a navigator.	1	2	3	4	5
16.	Additional duties interfered with my studying.	1	2	3	4	5
17.	The written tests were thorough.	1	2	3	4	5
18.	The training devices were operational most of the time.	1	2	3	4	5
19.	The training literature seemed related to course objectives.	1	2	3	4	5
20.	The training devices helped me to better understand new concepts.	1	2	3	4	5
21.	My instructors presented the material in an interesting and knowledgeable manner.	1	2	3	4	5
22.	My instructors' presentations were clarified by examples and illustrations.	1	2	3	4	5
23.	UNT is so regimented that the environment is not conducive to learning.	1	2	3	4	5
24.	The training films helped me to understand the subject matter more fully.	1	2	3	4	5
25.	My training literature was comprehensible.	1	2	3	4	5

IMPORTANCE-POSSIBILITY SCALE

NAME _____ DATE _____

SSAN _____

DIRECTIONS: Below are several statements which students have used to describe how they felt about being in the Air Force. Read each statement carefully and then indicate how you feel.

In reaching your decision to become an Air Force officer, this factor was of	Major Importance	Minor Importance	No Importance
1. Opportunity to continue formal education	____	____	____
2. Wanted an Air Force career	____	____	____
3. Opportunity to meet people	____	____	____
4. Fulfilling your military obligation	____	____	____
5. Wanted to fly	____	____	____
6. Better Opportunities in AF than in civilian life	____	____	____
7. Opportunity to travel	____	____	____
8. No satisfying civilian job available	____	____	____
9. Prestige and status of AF officer appealed to me	____	____	____
10. Bored with civilian life	____	____	____

	No obligation	Yes	Maybe	No
11. If you had no military obligation, would you still want to be in the Air Force?				

	4 Yrs	5 Yrs	6 Yrs	More than 6 Yrs	None of These
12. Would you have applied for a commission if your obligated tour of duty were (choose one)					

	Yes	No
13. Upon graduation from college, did you hold a full-time civilian job?		
14. Are you satisfied with your present job?		

	Yes	Maybe	No
15. Do you plan to make a career of the Air Force?			
16. If you were offered a regular AF commission, would you plan to make a career of the Air Force?			

17.	Has the AF officer program lived up to your expectations?	In All Respects	In Most Respects	In Few Respects
18.	From what you know now of the Air Force, do you feel that you will be happy and satisfied in your tour of duty?	Yes	Probably	No
19.	If you were offered a regular commission, would you accept it?	Yes	Maybe	No

APPENDIX B: ANXIETY-STATE SCALE (SHORT FORM)

ANXIETY-STATE SCALE (SHORT FORM)

NAME _____ DATE _____

SSAN _____

DIRECTIONS: A number of statements which students have used to describe how they felt while learning new materials are given below. Read each statement carefully and then circle the number which indicates how you felt while you were learning the UNT course materials you have just completed.

There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer to describe best how you felt.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I felt calm.	1	2	3	4
2. I felt tense.	1	2	3	4
3. I felt jittery.	1	2	3	4
4. I felt self-confident.	1	2	3	4
5. I felt relaxed.	1	2	3	4
6. I felt anxious.	1	2	3	4
7. I felt at ease.	1	2	3	4

APPENDIX C: INTERVIEW FORMATS

ELIMINEE INTERVIEW

Obtain information for items 1-6 from elimination letter.

1. Name and Grade:

2. SSAN:

3. Date of Interview:

4. Class:

5. Cause of Elimination: (Circle one)

   FD MOA SIE MED ACAD ADMIN

6. Phase Eliminated from:

Tell student that:

This interview is strictly confidential.

It in no way means your case is being reconsidered or reevaluated.

7. Commission Source: OTS ROTC AFA OTHER (Specify)

8. Number of T-29 flight hours: _____

9. Prior service: _____(e.g., was student ever enlisted).

10. Are you married?

Dependents:

Do you have any older brothers or sisters?

11. What school did you graduate from?

What was your major field of study?

Did you consider trying to get a job in the Air Force which made use of your education?

What happened?

Do you have extensive experience in operating complex machinery? For example, farm equipment, construction equipment.

Do you have extensive experience in athletic competition? If so, what sport(s) and what kind of experience?

12. What is the student's next assignment?

13. Do you think you could briefly summarize the events which led to your elimination?

14. Were you weak in a previous phase on anything?

(What areas of UNT were the most difficult for you?)

Why?

15. When did you feel that elimination was probable?

16. Was your wife/family worried about your flying?

17. Did you seek advice or help, counseling and/or remedial training, from anyone?

From whom did you seek advice or help?

Did they attempt to help?

In what way?

If not, from whom would you seek advice or help had you wanted it?

18. Did you think you knew what UNT was going to be like?

If so, how did it compare to your expectations?

19. What suggestions would you make to someone just entering UNT?

20. What is the biggest hurdle(s) in UNT?

21. What influence did your element leader have on your training?

Your section leader?

22. Have you seen any discrimination in the Air Force?

In UNT?

If so, directed toward whom?

Explain.

23. Did you feel properly prepared for UNT?

Explain.

24. Did you feel that most students are properly prepared for UNT?

How could they be better prepared?

25. What aspects of UNT do you feel are the most displeasing?

26. If you could, what would you change (add or delete) in UNT?

27. What do you feel the present status of navigators is within the Air Force?

Explain.

SUCCESSFUL STUDENT INTERVIEW

1. Name and Grade:

2. SSAN:

3. Date of Interview:

4. Class:

5. Phase:

6. Commission Source: OTS ROTC AFA OTHER (Specify)

7. Prior service: _____ (e.g., was he ever enlisted).

8. Are you married?

   Dependents:

   Do you have any older brothers or sisters?

9. What school did you graduate from?

   What was your major field of study?

   Did you consider trying to get a job in the Air Force which made use of your education?

   What happened?

   Do you have extensive experience in operating complex machinery? For example, farm equipment, construction equipment.

   Do you have extensive experience in athletic competition? If so, what sport(s) and what kind of experience.

10. What is the student's next assignment?

11. What areas in UNT are the most difficult for you?

Why?

12. Have you asked for advice or help, counseling and/or remedial training, from anyone?

From whom did you seek advice or help?

Did they attempt to help?

In what way?

If not, from whom would you seek advice or help had you wanted it?

13. Did you think you knew what UNT was going to be like?

If so, how did it compare to your expectations?

14. What suggestions would you make to someone just entering UNT:

15. What aspects of UNT do you feel are the most displeasing?

16. If you could, what would you change (add or delete) in UNT?

    Why?

17. What is the biggest hurdle(s) in the UNT program?

18. In your opinion, what is the major underlying reason for self-initiated elimination from UNT?

    For other types of elimination?

19. Have you seen any discrimination in the Air Force?

In UNT?

If so, directed toward whom?

Explain.

20. Did you feel properly prepared for UNT?

Explain.

Do you feel most students are properly prepared for UNT?

How could they be better prepared?

21. What influence did your element leader have on your training?

Section leader?

22. What do you feel the present status of navigators is within the Air Force?

Explain.

INSTRUCTOR INTERVIEW

1. Name and Grade:

2. SSAN:

3. Date of Interview:

4. Instructor Experience (Months):

5. Phase:

6. Commission Source: OTS ROTC AFA OTHER (Specify)

7. Number of flight hours: _____

8. Years of service: _____

9. Are you married:

   Dependents:

   Do you have any older brothers or sisters?

10. What school did you graduate from?

    What was your major field of study?

    Did you consider trying to get a job in the Air Force which made use of your education?

    What happened?

    Do you have extensive experience in operating complex machinery? For example, farm equipment, construction equipment.

    Do you have extensive experience in athletic competition? If so, what sport(s) and what kind of experience?

11. What are the most difficult areas in UNT?

    Why?

12. What are the most difficult areas in UNT?

    Why?

13. What are the most critical tasks that must be mastered in order for UNT completion?

    Are they difficult?

14. What suggestions would you make to someone just entering UNT?

15. If a student is having difficulty, what help, counseling and/or remedial training, is available?

16. What is the biggest hurdle(s) in the UNT program?

17. What aspects of UNT do you feel are the most displeasing to the student?

18. If you could, what would you change (add or delete) in UNT?

Why?

19. In your opinion, what is the major underlying reason for self-initiated elimination from UNT?

For other types of elimination?

20. Have you seen any discrimination in the Air Force?

UNT?

If so, directed toward whom?

Explain.

21. Do you feel that most students are properly prepared for UNT?

Explain.

22. What do you feel the present status of navigators is within the Air Force?

Explain.

APPENDIX D: INSTRUCTOR RATING FORM

INSTRUCTOR RATING FORM

INSTRUCTOR'S NAME _____

INSTRUCTOR'S PHASE _____

Please study each factor carefully and then circle the number which is most applicable for this instructor. These ratings will be held in strictest confidence.

	Unsatisfactory	Poor	Fair	Good	Excellent
1. Knowledge of subject matter.*	1	2	3	4	5
2. Ability to communicate subject matter.*	1	2	3	4	5
3. Rapport with students.	1	2	3	4	5
4. Attitude toward students.	1	2	3	4	5
5. Attitude toward teaching	1	2	3	4	5
6. Attitude toward UNT.	1	2	3	4	5
7. Attitude toward USAF.	1	2	3	4	5
8. Relationship with other instructors.	1	2	3	4	5
9. Relationship with supervisors.	1	2	3	4	5
10. Overall rating as an instructor.	1	2	3	4	5
11. Overall rating as an officer.	1	2	3	4	5

* These items pertain to the subject matter he is presently teaching.

APPENDIX E: PHASE DIFFICULTY RATING FORM

PHASE DIFFICULTY RATING FORM (ELEMENT LEADERS)

NAME: _____ RANK _____

DIRECTIONS: Please rank order each of the following phases of UNT from easiest to most difficult. The phase that you consider to be the easiest should be assigned a rank of 1, the next easiest phase a rank of 2, and so on.

PHASE	RANK
Aviation Physiology	____
Aircraft Equipment	____
Aircraft Systems	____
Navigation Procedures	____
Map Reading	____
Radar Navigation	____
Day Celestial Navigation	____
Night Celestial Navigation	____
Grid Navigation	____
Weather	____
Overwater Navigation	____
Low Level Navigation	____
Flight Publications	____

APPENDIX F: SUMMARY STATISTICS, T-VALUES AND SIGNIFICANCE LEVELS FOR COMPARISON OF CROSS-SECTIONAL AND LONGITUDINAL SAMPLE REGRESSION VARIABLES.

Summary Statistics, T Values, and Significance Levels for
Regression Analysis Variables from Cross Sectional and Longitudinal Samples
(Eliminated Students)

	CROSS SECTIONAL SAMPLE				LONGITUDINAL SAMPLE				
VARIABLE	MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	T
16PF									
Factor A	5.524	1.703	.2145	63	5.261	1.982	.4133	23	.5646 (N.S.)
B	6.281	1.660	.2091		6.783	1.476	.3077		1.079 (N.S.)
C	5.857	1.900	.2393		5.652	1.945	.4055		.4352 (N.S.)
E	6.460	1.721	.2168		6.304	1.329	.2772		.4433 (N.S.)
F	6.476	1.959	.2457		6.261	2.281	.4756		.4022 (N.S.)
G	5.524	1.865	.2350		6.652	1.898	.3957		2.452 (.01)
H	5.873	1.680	.2117		5.826	2.367	.4936		.0873 (N.S.)
I	5.857	1.999	.2518		5.783	1.594	.3324		.1787 (N.S.)
L	5.825	1.854	.2336		5.783	1.833	.3822		.0955 (N.S.)
M	5.825	1.836	.2314		5.609	1.948	.4062		.4635 (N.S.)
N	5.064	1.615	.2035		5.391	2.017	.4205		.7017 (N.S.)
O	4.937	1.777	.2239		5.478	2.042	.4258		1.126 (N.S.)
Q_1	6.508	1.891	.2383		6.652	1.945	.4055		.3068 (N.S.)
Q_2	6.381	1.660	.2091		5.826	1.696	.3537		1.350 (N.S.)
Q_3	5.698	1.915	.2412		6.044	1.870	.3900		.7525 (N.S.)
Q_4	5.286	1.955	.2463		5.391	2.105	.4389		.2098 (N.S.)
Q_{II}	5.081	1.786	.2250		5.322	2.052	.4279		.4981 (N.S.)
MAT Career Unintegrated	5.571	1.663	.2095		5.304	1.869	.3898		.6036 (N.S.)
Fear Unintegrated	4.397	1.897	.2390		4.652	2.328	.4854		.4721 (N.S.)
Self Concept Unintegrated	5.016	1.651	.2080		5.435	1.674	.3491		1.031 (N.S.)
Assertiveness Unintegrated	5.429	2.014	.2537		6.130	2.074	.4324		1.40 (N.S.)
Career Integrated	5.175	1.765	.2223		4.696	1.636	.3411		1.178 (N.S.)

VARIABLE	CROSS SECTIONAL SAMPLE				LONGITUDINAL SAMPLE				T
	MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	
Fear Integrated	5.111	2.009	.2531	63	5.609	1.901	.3963	23	1.058(N.S.)
Self Concept Integrated	6.064	1.501	.1891		5.870	1.576	.3285		.5115 (N.S.)
Assertiveness Integrated	4.778	1.844	.2324		5.130	1.456	.3035		.9224 (N.S.)
AFOQT-Navigator Composite	57.86	23.55	2.967		52.00	24.68	5.147		.9839 (N.S.)
AFOQT-Officer Composite	58.57	26.35	3.320		60.26	25.52	5.321		.2694 (N.S.)
Importance Possibility Scale	38.83	5.690	.7168		43.09	3.554	.7410		4.134 (.01)
Attitude Toward Navigation	2.931	.6555	.0826		3.711	.4755	.0992		6.053 (.01)
Attitude Toward Military	3.313	.7143	.0900		3.952	.3837	.0800		5.307(.01)
Air Force Officer's Scale	36.51	9.381	1.182		39.61	9.801	2.044		1.313 (N.S.)
Academic Achievement Scale	48.46	13.04	1.643		48.96	16.71	3.484		.298 (N.S.)
Diversity of Interests Scale	60.27	9.981	1.258		62.96	14.48	3.019		.8224 (N.S.)

VARIABLE	CROSS SECTIONAL SAMPLE				LONGITUDINAL SAMPLE				T
	MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	
Masculinity-Feminity Scale	52.05	10.16	1.281	63	50.65	12.01	2.504	23	.4978 (N.S.)
Occupational Introversion Extroversion	40.98	11.03	1.390		39.48	16.45	3.430		.4053 (N.S.)
Trait Anxiety Inventory	1.629	.4115	.0518		1.514	.4708	.0982		1.036 (N.S.)

Summary Statistics, T Values, and Significance Levels for
Regression Analysis Variables from Cross Sectional and Longitudinal Samples
(Successful Students)

VARIABLE	CROSS SECTIONAL SAMPLE MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	LONGITUDINAL SAMPLE MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	T
16PF									
Factor A	4.565	1.920	.1382	193	4.897	1.886	.0995	359	1.951 (.05)
B	6.798	1.925	.1385		7.315	1.518	.0801		3.230 (.01)
C	5.731	1.851	.1333		6.401	1.982	.1046		3.958 (.01)
E	6.560	1.914	.1378		6.593	1.764	.0931		.2025 (N.S.)
F	6.098	1.822	.1311		6.579	1.995	.1053		2.859 (.01)
G	5.544	2.069	.1489		6.362	1.889	.0997		4.566 (.01)
H	5.539	2.177	.1567		5.802	2.196	.1159		1.350 (N.S.)
I	5.513	1.969	.1417		5.075	1.925	.1016		2.511 (.02)
L	6.047	1.985	.1429		5.420	1.859	.0981		3.615 (.01)
M	5.508	1.595	.1148		5.721	1.794	.0947		1.434 (N.S.)
N	4.974	1.932	.1391		4.922	1.784	.0942		.3108 (N.S.)
O	5.145	1.803	.1298		4.769	1.716	.0905		2.308
Q_1	6.570	1.903	.1370		6.070	1.847	.0975		2.974 (.01)
Q_2	6.497	1.993	.1434		5.925	2.006	.0159		3.213 (.01)
Q_3	5.472	1.849	.1331		6.153	1.916	.1011		4.081 (.01)
Q_4	5.482	1.963	.1413		5.106	2.092	.1105		2.469 (.02)
Q_{II}	5.302	1.780	.1295		4.767	1.878	.0991		3.282 (.01)
MAT Career Unintegrated	5.399	1.771	.1275		5.599	1.879	.0992		.1985 (N.S.)
Fear Unintegrated	4.617	1.732	.1246		1.577	1.811	.0956		.2546 (N.S.)
Self Concept Unintegrated	4.606	1.820	.1310		4.655	1.799	.0950		.3028 (N.S.)
Assertiveness Unintegrated	5.959	1.779	.1281		5.760	1.790	.0945		1.250 (N.S.)
Career Integrated	5.793	1.753	.1261		5.501	1.688	.0891		1.891 (.05)

VARIABLE	CROSS SECTIONAL SAMPLE MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	LONGITUDINAL SAMPLE MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	T
Fear Integrated	5.114	2.028	.1460	193	5.493	1.993	.1052	359	2.106 (.05)
Self Concept Integrated	5.855	1.461	.1052		5.719	1.458	.0769		1.044 (N.S.)
Assertiveness Integrated	4.762	1.752	.1261		4.908	1.716	.0906		.9403 (N.S.)
AFOQT-Navigator Composite	63.53	22.59	1.626		60.48	23.76	1.255		1.485 (N.S.)
AFOQT-Officer Composite	64.72	23.87	1.718		62.24	24.39	1.287		1.155 (N.S.)
Importance Possibility Scale	42.21	4.953	.3565		44.28	3.698	.1951		5.094 (.01)
Attitude Toward Navigation	3.475	.5568	.0401		3.689	.4583	.0242		4.569 (.01)
Attitude Toward Military	3.730	.5791	.0417		3.970	.4762	.0251		4.931 (.01)
Air Force Officer's Scale	40.94	11.09	.7981		43.71	10.26	.5417		2.872 (.01)
Academic Achievement Scale	48.88	12.45	.8958		48.40	10.43	.5505		.4565 (N.S.)
Diversity of Interests Scale	58.80	13.65	.9828		60.23	11.46	.6049		1.239 (N.S.)

VARIABLE	CROSS SECTIONAL SAMPLE MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	LONGITUDINAL SAMPLE MEAN	STANDARD DEVIATION	STANDARD ERROR	SAMPLE SIZE	T
Masculinity-Feminity Scale	54.82	11.37	.8186	193	55.98	11.41	.6022	359	1.141 (N.S.)
Occupational Introversion Extroversion	44.82	13.42	.9658		43.04	13.00	.6859		1.503 (N.S.)
Trait Anxiety Inventory	1.665	.4018	.0289		1.480	.3331	.0176		5.467 (.01)

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